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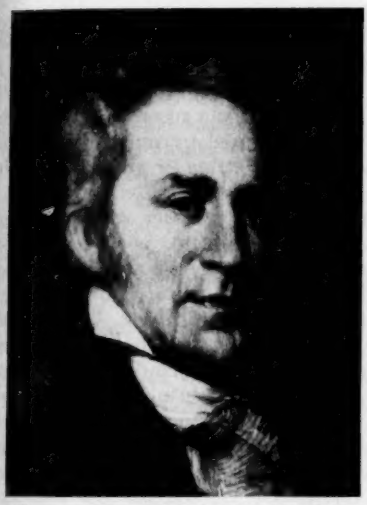
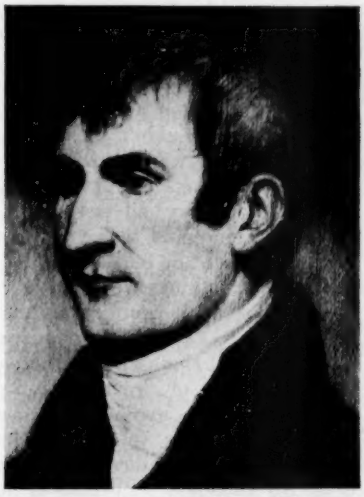


WILLIAM CLARK, by *Rembrandt Peale*



MERIWETHER LEWIS, by *Charles Willson Peale*

(Courtesy Independence Hall Collection, Philadelphia)

TO MERIWETHER LEWIS AND WILLIAM CLARK, PIONEER EXPLORERS OF THE AMERICAN WEST, ON THE 150TH ANNIVERSARY OF THEIR EXPEDITION OF DISCOVERY, 1804–1806, IN RECOGNITION OF THEIR CONTRIBUTIONS TO SCIENCE

Contributors by Invitation

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Lewis and Clark's Background for Exploration

By John E. Bakeless (Seymour, Conn.)

An eminent American explorer some years ago asserted, publicly, that to have an adventure of any kind on an exploring expedition was merely a reflection on the leader, just evidence of his incompetence or bad management. The idea was that if you knew your job and if you had made proper preparation things couldn't possibly go wrong, no matter how wild the country you went through. If things didn't go wrong, there wouldn't be any adventures. The exploring expedition could then go placidly about its proper scientific business.

There are several things wrong with that theory. For one thing, it simply does not lie in human power to be quite so omniscient and far-seeing as all that. For another, the idea is just a kind of "reverse vanity." The "old-fashioned" explorer—at least when he was lecturing to Chautauquas, teachers' institutes, and ladies' clubs—liked to astonish his audiences with tales of hair-breadth escapes and derring-do. It worked very well. The audience loved him for the danger he had passed. The modestly—not too modestly—implied attitude was simply: "See what a very devil of a chap I am!"

The modern attitude, as expressed above, is very nearly as bad. It is just: "See what a clever fellow I am at arranging things." On the whole, one rather prefers the dare-devil pose. It isn't quite so smug.

Nevertheless, there is something to be said for the modern idea; and, like most modern ideas, it turns out not to be very modern after all. An adventure sometimes does mean only that an error has been committed somewhere, somebody has failed to collect advance information, somebody has failed to foresee something or other, somehow. The very early explorers of North America suffered terribly, simply because they omitted a few very simple and obvious precautions. Cabeza de Vaca's account of his tortures from mosquitoes along the Gulf coast would wring the stoutest heart. But then, Cabeza de Vaca tried sleeping naked in mosquito country. It was too late, by that time, to get a mosquito net. But why didn't he bring one from Spain in the beginning?

The queer thing is that so many of the early explorers of North America took so long to learn even a simple little thing like that. Yet there is one account after another of the agony caused by mosquitoes, which a few yards of netting or any kind of thin cloth would have obviated entirely.

Now, when we consider what it accomplished, the complete newness of the country, and the immense area it traversed, the Lewis and Clark expedition ran into astoundingly few difficulties. When it did run into difficulties, they had usually been foreseen and the commanders were always ready to cope with them. The expedition's success is really a monument to careful preparation. The success was so great that it almost justifies the distinguished modern explorer, above quoted, in his insistence that adventure is evidence of incompetence, though, as a matter of fact, the Lewis and Clark expedition had plenty of adventures, some of them very uncomfortable, which no amount of careful preparation could have prevented. They had, for instance, practically no idea of how little difference half a dozen rifle bullets made to the gigantic Plains grizzlies; but then they were very nearly (not quite) the first white men to encounter grizzlies.

Nevertheless, Lewis and Clark achieved a resounding success. They did it with the loss of only one man—and that from illness.

Lewis and Clark crossed the continent at a point where it had never been crossed before. They were the first explorers of the upper Missouri, from about Bismarck, N. Dak., on. They were the first explorers of long stretches of the Columbia River. They found a way of their own over the Rockies. It wasn't a very good way, and they missed some much better routes; but they got over the "Shining Mountains" all the same. They brought back voluminous reports on terrain, Indians, fossils, languages, plants, animals,

geography, and the country in general. They brought back an amazing series of maps, mostly of country that had never before been seen by white men. They brought back, or sent back, some live animals. They brought back also any number of new plants, or their seeds, which went straight into botanical gardens for testing.

They accomplished all this at very little cost to the Government. A part of their enlisted personnel were Regular Army soldiers, who would have been drawing pay anyhow—though some of the men were specially enlisted for the expedition. Lewis himself was an army officer, presumably on detached service as President Jefferson's secretary; and Clark's pay could have been written off in the same way, if he hadn't resigned from the Army a few years earlier.

When it came to rewarding the members of the expedition, when the exploring was all done, the cost to the Government was nil, or nearly so. A grateful country gave the officers and men generous grants of land, which, in those days, was plentiful, which cost even purchasers very little, and which cost the Government nothing at all. In other words, the total cost of exploring about half the United States was negligible. Seldom have so many gotten so much service from so few for so little cash.[1]

Preparations had begun long before the expedition started. The scheme had been dear to Mr. Jefferson for many years. He had proposed it to William Clark's elder brother, George Rogers Clark, as early as 1782, and he had long been trying to learn all he could about the western country. Before the Lewis and Clark expedition pushed off from near St. Louis, they had gathered a collection of information, published and unpublished, from previous travelers, that would have done credit to a modern military intelligence service. So far as advance information was possible at all, they had it.

[1] It has recently been computed, on the basis of official records of disbursements, that the cost of the Lewis and Clark Expedition (including pay) to December 1805 was $22,393.75. See GRACE LEWIS, *Financial Records, "Expedition to the Pacific Ocean."* Missouri Hist. Soc. Bull. **10**(4): 465–489. The cost of the remainder of the expedition must have consisted almost entirely of pay items.–EDITOR'S NOTE.

The selection of Lewis by Jefferson and of Clark by Lewis was the next great element in the success of the expedition. The officers' choice of their men was part of the same process of sifting and selecting. Jefferson had known Meriwether Lewis—they were both from Albemarle County—all his life. As early as 1792, young Lewis, then 18, had been begging Mr. Jefferson to send him on the expedition, which Jefferson had, even at that time, been contemplating for at least ten years. Mr. Jefferson thereafter kept an eye on that young man.

Mr. Jefferson knew exactly what he wanted. In this case he wanted a great deal. As he wrote Caspar Wistar, in Philadelphia, he was looking for "a person who to courage, prudence, habits & health adapted to the woods, & some familiarity with the Indian character, joints a perfect knoledge of botany, natural history, mineralogy & astronomy." Unfortunately, no such paragon of a polymath seemed handy at the moment. Would Captain Lewis do? Jefferson thought so. He had "the first qualifications"—that is, he had been in the western wilderness beyond Pittsburgh with the army for several years. And, though no one even then could take him seriously as a man of science, he did have "a great mass of accurate observation made on the different subjects of the three kingdoms as existing in these states, not under their scientific forms, but so as that he will readily seize whatever is new in the country he passes thro."

Lewis must have been looking for about the same qualifications when he chose Clark. In the eighteenth century you either were educated or you weren't. Most people weren't, and made no pretense about it. Even those who were genuinely educated might not have much formal schooling, and a good many of them couldn't spell (at least, they didn't). But what they knew, they really did know. No foolish line was drawn between the humanities and the sciences. Educated people wanted both and got them. Mr. Jefferson himself described the Lewis and Clark expedition as a "literary" undertaking. Many of the gentry took a keen interest in the life of forest, woods, and streams. Some even dabbed in paleontology, though one of the enlisted

men of the expedition unfortunately described a 45-foot fossil as "a ruck of Bones on the Bank." George Rogers Clark used to dismount in the middle of a hunt to watch ants for an hour or so—greatly to the annoyance of his fellow huntsmen. One Oxford botanist delayed publication of a mighty tome till he could get specimens from a Virginia amateur.

William Clark had had as good an education as most of the local gentry. College education was only for people like Mr. Jefferson and Mr. Monroe. (It is improbable that anyone had even imagined a graduate school.) William Clark had studied with the schoolmaster Richard Higgins in Caroline Country. Somewhere he had learned to draw, not brilliantly but well enough for the purposes of the expedition. Clark had also learned enough about topography to make surprisingly good maps. As for wild nature, he had never been very far from it in his Virginia boyhood; he had seen real wilderness on Wayne's campaign of 1794; he had probably emulated his brother as a naturalist.

Clark and Lewis had served in the same infantry company and knew they could get along together. On the Lewis and Clark expedition (though the War Department didn't plan it that way), there was not going to be any junior officer. There was to be a joint command and perfect equality. Lewis had assured his friend that "your situation if joined with me in this mission will in all respects be precisely such as my own."

Never before or after in military history has such a command worked. This time it was successful. Even under the danger, discomfort, exhaustion, and general strain of wilderness travel (which makes tempers snap like fiddle strings), there was perfect harmony in the joint command.

Lewis had evidently been doing a little scientific cramming before the expedition started. Mr. Jefferson hopefully supposed he had "qualified himself for fixing the longitude & latitude of the different points in the line he will go over." The idea was that, in the uncharted wilderness through which the expedition would pass, where there were practically no known points, navigation offered the easiest way of showing where the explorers had been. Mr. Jefferson, however, greatly overestimated the capacity of an infantry officer to navigate. Lewis's navigation was one of his two worst failures. Fortunately for his reputation, it is not always possible to tell just how bad it was. But in some cases, notably where one river flows into another, he is sometimes many miles out of the way in fixing his position. The streams may have shifted, to be sure, but not so much as that. Two naval officers, shaking their heads sadly, have assured me that not even a midshipman could be so far off in making a "fix."

Lewis went to Philadelphia and Lancaster, Pa., to buy scientific instruments. The Philadelphia quartermaster depot supplied other equipment. There seems little doubt that he tried, at the same time, to get as many scientific hints as he could; and he laid in a choice line of medicines from the famous Dr. Benjamin Rush. Whatever happened, the expedition always felt it could fall back on Dr. Rush's pills. When they were in the last stages of exhaustion after the Rocky Mountain crossing, it was to Dr. Rush's pills that Clark turned, Lewis being too nearly dead to do anything at all. Clark administered the wonderful pills plentifully to his worn out men, "to see what effect that would have," according to Sergeant Patrick Gass.

Other medical preparations were so carefully made that Lewis had the venereal specifics of his day, all ready in his first aid kit, when some men became infected on the Pacific coast. On the return trip, it was medicine—plus, no doubt, a good deal of simple aboriginal faith—that won them needed favor among the Nez Percés. Lewis's mother was a famous amateur doctor. His half-brother later set up in genuine practice. Lewis and Clark won a great reputation in the Rockies, both as oculists and as general practitioners. Their treatments seem to have been really effective and not (like those that saved Cabaca de Vaca, in Texas, more than two centuries earlier) mere faith cures.

Another example of foresighted preparation was the packing of the reserve ammunition. The powder was sealed in lead kegs. These were perfectly water tight. Best of all, when each keg was empty it

could be melted down for bullets, a simple operation familiar to everyone. Even the possible failure of this ammunition was considered. Nobody knew just how far the expedition had to go, what it would run into, or when it would be back. It was impossible to be sure that even its plentiful ammunition reserves would last the trip. Hence Lewis procured his famous airgun. If worst came to worst the expedition would have one ballistic weapon to fall back on. As it turned out, the ammunition supply was ample, the main use of the airgun was to impress astounded Indians.

The greatest logistic failure of the expedition was the wonderful iron boat, which Lewis himself had designed, and which the Harpers Ferry arsenal had built to his order. Its failure proves that infantry officers had better leave not only navigation but naval architecture as well in the Navy's hands. The boat consisted entirely of an iron framework, which could be taken apart. It was easily packed and easily carried all the way to the Great Falls, in present Montana. The idea was that an outer covering for the framework could be picked up in the field. The expedition would have plenty of boats on its way up the Missouri River. But sooner or later, it would have to portage. After Lewis and Clark reached their first big obstacle, past which the keelboats could not go, the iron boat was to come into its own.

That obstacle turned out to be the Great Falls of the Missouri. Triumphantly, Lewis got out his iron frame, oiled it, and put it together. It fitted perfectly. But, alas! Accustomed only to the eastern forests, he had never anticipated that there would be no birch bark on the Missouri in Montana.

Well, there was plenty of elkskin. Regrettably, the elkskin shrank. Where there was no birch there was no pine either to supply pitch to waterproof the skins. The ever-ready Lewis improvised a mixture of charcoal, beeswax, and buffalo tallow. After two coats of this stuff the skins kept out the water and the boat he had named *The Experiment*, the captain noted triumphantly, "lay like a perfect cork on the water." But not for long. The tallow cracked, the elkskins shrank. After carrying his treasure so far, Lewis had to abandon her in the end.

The most skillful part of all the preparation was the choice of enlisted men. Like the leaders of every other expedition in history, Lewis and Clark were beset with "yearners," who thought it would be just too wonderful to go out and be adventurous. Clark described these people as young gentlemen, "not accustomed to labour." What Lewis told him to get was "some good hunters, stout, healthy, unmarried young men, accustomed to the woods, and capable of bearing bodily fatigue to a pretty considerable degree." He also wanted some really good soldiers; and—backed by Presidential authority, though amid anguished outcry from indignant commanders bereft of their best non-coms—he got them.

Not satisfied with their original careful selection, the two commanders watched their men carefully on the first leg of the trip (in 1804) as far as the Mandan Villages, near Bismarck, N. Dak. There was some lax discipline, one case of insubordination, and a number of courts martial.[2] From the Mandan Villages the trouble-makers, including a very repentant one, went home next spring (1805). Thereafter, the rest of the way across the continent and all the way back, through toil, hardship, hunger, disease, exhaustion, and the gravest dangers, the expedition showed the most perfect esprit de corps. No more courts-martial.

The employment of the famous squaw, Sacagawea was another example of foresight. Every one ought to know by this time that it is all nonsense to say she "guided" the expedition. So long as Lewis and Clark were on the Missouri, they didn't need any guide. When they were in and over the Rockies, Sacagawea knew no more about the country than anyone else. No one is so utterly lost as a perfectly trained Indian

[2] Incidentally, it was Lewis and Clark who invented the system of having enlisted men on courts-martial, about which there has been so much fuss since World War II. It is doubtful if their system was legal under the articles of war of that day, but it worked beautifully. And when Lewis and Clark came home triumphant, not even the War Department was tempted to quibble, though the two commanders dutifully reported it all in their journals.

outside his own country. But in the crucial meeting with the Shoshones, Sacagawea provided the translation and the personal contacts that saved the day—and provided horses.

Not even the expedition's luck in meeting with the very band from which Sacagawea had been kidnaped, and of which her brother had become chief, can be set down to mere chance. The two leaders had always known they were going to need an interpreter at about this point. For that purpose they had taken the little squaw along. That they also had to take her baby and her worthless husband was just everybody's hard luck. They brought the baby home alive and well, after some experimental pediatrics by Captain Clark.

You can say of the Lewis and Clark expedition that it was a model of courage and devotion. It was. But most of all, it was a model of really good logistics, first-class staff work. It showed what really good officers could do, when given a free hand.

Cartographic and Geographic Activities of the Lewis and Clark Expedition[1]

By Herman R. Friis (The National Archives)

INTRODUCTION

Capt. Meriwether Lewis in his letter to President Thomas Jefferson dated St. Louis, September 23, 1806, remarked:

> It is with pleasure that I announce to you the safe arrival of myself and party at 12 OC'k today at this place with our papers and our baggage. In obedience to your orders we have penetrated the Continent of North America to the Pacific Ocean, and sufficiently explored the interior of the country to affirm with confidence that we have discovered the most practicable rout [sic] which does exist across the continent by means of the navigable branches of the Missouri and Columbia Rivers. . . .[2]

Capts. Meriwether Lewis and William Clark and the members of their exploring expedition with justifiable pride could say "mission accomplished." Few of us would challenge their right to fame and to permanent recognition as members of a team whose general geographical achievements and orderly process of pursuing an objective rank with epics in geographical exploration. Yet, their accomplishments, significant as they were, were to a surprising extent a natural culmination of a long series of incessant probings by individuals and groups of individuals into the vast *terra incognita* of western North America that tantalized the imagination of geographers, commercial interests, politicians, and land-hungry nations during the several centuries before Lewis and Clark's successful transection.

The role Thomas Jefferson played in this drama was large, larger perhaps than is generally realized. His was the spark that kindled the idea, as it was his genius in planning and organizing the drive that foreshadowed certain success. Jefferson recognized the full implication of a thorough scientific knowledge of Western America, as indeed he understood the great stakes that were involved for the United States in the international game of power politics then reaching for a showdown for control of this vast inland empire. Perhaps it was with these things in mind that he voiced his concern for the records created by the expedition during its three-year tour of duty. In his letter of April 26, 1816, to Abbé Correa da Serra, Jefferson describes the records and notes that—

[1] In addition to using the secondary sources cited in this paper and other published sources the writer has consulted the Lewis and Clark Journals and other records in the Library of the American Philosophical Society, Philadelphia, Pa.; the Thomas Jefferson Papers in the Manuscripts Division and several Lewis and Clark maps in the Map Division of the Library of Congress, Washington, D. C.; records of the Office of the Chief of Engineers and of the United States Senate in the National Archives, Washington, D. C.; and fiscal records in the Tribal Claims Section, General Accounting Office, Washington, D. C.

[2] Letter from Meriwether Lewis (Captain) to Thomas Jefferson (President of the United States), dated St. Louis, September 23, 1806, in the Thomas Jefferson Papers, vol. 161, in the Manuscripts Division, LC.

These constitute the whole. they are the property of the government, the fruits of the expedition undertaken at such expence of money and risk of valuable lives. they contain exactly the whole of the information which it was our object to obtain for the benefit of our own country and of the world. but we were willing to give to Lewis and Clarke whatever pecuniary benefits might be derived from the publication, and therefore left the papers in their hands, taking for granted that their interests would produce a speedy publication, which would be better if done under their direction. but the death of Capt. Lewis, the distance and occupations of General Clarke, and the bankruptcy of their bookseller, have retarded the publication, and rendered necessary that the government should attend to the reclamation & security of the papers. their recovery is now become an imperious duty. their safest deposit as fast as they can be collected, will be the Philosophical Society, who no doubt will be so kind as to receive and preserve them, subject to the orders of the government; . . .[3]

Unfortunately for posterity the results of this first scientific exploring expedition sponsored by the Federal Government were not retained *in toto* in Federal custody but, as Jefferson noted, quickly were scattered and until recently a good many had been feared "lost." It is fortunate that some of the basic records found safe haven[4] and continuous preservation and that, with a resurgence of interest in the Lewis and Clark expedition in recent years, competent scholars have made those records available through publication.[5]

The geographical and cartographic contributions of the Lewis and Clark expedition as revealed in the records are relatively considerable, though in details sometimes inaccurate, and went far toward giving the world a clearer concept of the North American Continent. The expedition closed a large gap in contemporary knowledge, a gap that had remained during several centuries of relentless search for the Northwest Passage to the fabulous cities of the Orient. Lewis and Clark discovered a route, a passage, but it was overland.[6]

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[3] Letter from Thomas Jefferson to Abbé Correa da Serra dated Poplar Forest, April 26, 1816; manuscript in American Philosophical Society. See also Reuben G. Thwaites (ed.): *Original Journals of the Lewis and Clark Expedition, 1804–1806* . . ., New York, 1905. 7 vols. and atlas. Vol. 7, pp. 394–396. Jefferson's long association with the Society (elected to membership in 1780, Councillor 1781–1785, Vice President 1791–1794, President 1797–1815, and Councillor 1818–1826) must have bulked large in his judgment of the wisdom of this arrangement.

[4] Significant among depositories in which Lewis and Clark records and personal papers are located are the following:

(a) The journals, notes, a few maps and other papers in the American Philosophical Society, Philadelphia, Pa.

(b) Some 55 manuscript maps (mostly by Clark) in the Coe Collection, Yale University Library, New Haven, Conn.

(c) Letters, correspondence, a map, and other official records pertaining to the expedition and to the official employment of members of the expedition may be found among the Records of the Office of the Chief of Engineers, Records of the United States Senate, Records of the Bureau of Indian Affairs, and Records of the Office of the Secretary of War, in the National Archives, Washington, D. C.

(d) Maps (originally in the Bureau of Indian Affairs) in the Map Division, and letters and papers, especially in the Thomas Jefferson Papers, in the Manuscripts Division, in the Library of Congress, Washington, D. C.

(e) There recently (1953) were discovered in Minneapolis, Minn., certain Clark manuscripts, notably maps. These currently are in the custody of the Minnesota Historical Society, St. Paul, Minn., where they are being identified and described.

(f) Wisconsin Historical Society, notably the Draper Manuscripts, Madison, Wis.

(g) Missouri Historical Society, St. Louis, Mo.

(h) Kansas Historical Society, Topeka, Kans.

(i) Carl I. Wheat's *Mapping the American West, 1540–1857*, reprinted from Proc. Amer. Antiq. Soc. for Apr. 1954, is a significant contribution to the history of mapping and should receive wide use.

[5] The following are particularly useful:

(a) John E. Bakeless: *Lewis & Clark, partners in discovery*, 498 pp. New York, 1947.

(b) Nicholas Biddle: *History of the expedition under the command of Captains Lewis and Clark, to the sources of the Missouri, thence across the Rocky Mountains and down the River Columbia to the Pacific Ocean. Performed during the years 1804–5–6. By order of the Government of the United States.* 2 vols. Philadelphia, 1814.

(c) Elliott Coues (ed): *History of the expedition under the command of Lewis and Clark, to the sources of the Missouri River* . . , 4 vols. New York, 1893.

(d) Bernard De Voto (ed.): *The journals of Lewis and Clark*. 504 pp. Boston, 1953.

(e) Reuben G. Thwaites (ed.): *Original journals of the Lewis and Clark Expedition, 1804–1806; printed from the original manuscripts in the Library of the American Philosophical Society and by Direction of its Committee on Historical Documents*, . . . 8 vols. New York, 1904–1905. This easily is the best single publication on the subject and has served as the basic source of information in the preparation of this paper. When cited hereafter it is abbreviated as L. and C. Vol. 8 is an atlas of maps (recently acquired by the Yale University Library).

(f) United States Government: "Lewis and Clark's Expedition," *American State Papers, Indian Affairs*, **1**: 705–743. Washington, 1832.

[6] See footnotes 1 and 5.

During the latter half of the eighteenth century geographical exploration of Western North America advanced at a rapid pace and led to a surprising fund of knowledge, some of which has only recently come to light.[7] England, France, Spain, and Russia were the principal participants in the drama, the main themes of which were the search for the Northwest and Northeast Passages to the Orient and for the vast riches thought to exist. By the end of the century the advances on all fronts had proved rather conclusively that the North American Continent was indeed a tremendous land mass, a barrier to a direct water route to Asia, though perhaps through it there might be found that conveniently located waterway making transcontinental passage possible. To those who wanted to believe there appeared to be sufficient proof that the several wide water entrances (Puget Sound, Columbia River, and San Francisco Bay) led far inland to meet with the rivers, such as the Missouri, draining eastward across the Great Plains and into the Mississippi.

The presumed limitless wealth in furs and in minerals as well as the anticipated brisk trade with the Indians served to spirit exploring expeditions and individuals into this "unknown region" from all approaches along the periphery. Terrain information acquired during exploratory surveys by Government-sponsored parties, by the padres and friars of religious orders, and by the field representatives of commercial interests often was carefully recorded and preserved, although frequently it was jealously guarded as secret information. The numerous treks into the interior by parties of intrepid traders and by free-lance individuals in search of traffic with the natives generally went unrecorded; such information about the "lay of the land" as was acquired was passed on verbally and often assumed fantastic proportions of untruth.

The amount of terrain information in the form of descriptive accounts of these exploratory expeditions and of the cartographic results that Thomas Jefferson had in his possession and that served to spark his relentless drive to discover the "West" we may never know. It may be safe to conclude that in his extensive library,[8] through his wide personal acquaintances at home and abroad, and during his periods of service to the Government in positions of trust, he acquired a mass of information about western America that placed him in a unique position and made possible the ultimate success of his expedition into the region, a success which might not have been achieved except that so much of the basic work had already been done by others.

THOMAS JEFFERSON'S HAND IN THE ACQUISITION OF LOUISIANA AND THE LEWIS AND CLARK EXPEDITION, 1803–1806

On January 18, 1803, Thomas Jefferson, as President of the United States, sent a confidential message[9] to Congress which was destined to bring about the achievement of two of his greatest ambitions, to have an American expedition cross the continent to the Pacific coast and to acquire the lands

[7] Many good sources are available. The following are a few of the useful general sources:
(a) Herbert E. Bolton and Thomas M. Marshall: *The colonization of North America, 1492–1783*. 609 pp. New York, 1936.
(b) John B. Brebner: *The explorers of North America, 1492–1806*, 502 pp. New York, 1933.
(c) Lawrence J. Burpee: *The search for the Western Sea: The story of the exploration of Northwestern America*. 2 vols. Toronto, 1935.
(d) Edward W. Gilbert: *The exploration of Western America, 1806–1850 An Historical Geography*. 233 pp. Cambridge, 1933.
(e) LeRoy R. Hafen and Carl C. Rister: *Western America: The exploration, settlement, and development of the region beyond the Mississippi*. 698 pp. New York, 1941.
(f) Reuben G. Thwaites (ed.): *Early Western Travels, 1748–1846*. 32 vols. Cleveland, 1904-1906.
(g) Reuben G. Thwaites: *A brief history of Rocky Mountain explorations, with especial reference to the expedition of Lewis and Clark*, 276 pp. New York, 1904.
(h) William Winterbottom: *An historical, geographical, and philosophical view of the American United States, and of the European settlements in America and the West Indies*, 4 vols. London, 1795.

[8] Thomas Jefferson: United States. Library of Congress. Catalogue of the Library of the United States. To Which is Annexed a Copious Index Alphabetically Arranged. Washington, 1815. 170 pp. A catalogue of some 7,000 volumes of essentially Thomas Jefferson's Library.

[9] For the "Confidential" manuscript original see *Original Messages from the Presidents, 7th Congress, 2d Session*, H. R. 4 pp. in the National Archives, Washington, D. C. For published versions (apparently not accurate transcriptions) see: Reuben G. Thwaites: *L and C*, vol. 7, pp. 206–208. Also *American State Papers, Indian Affairs* **1**: 684–685, Washington, 1832.

FIG. 2.—Page 2 of volume 3, codex I, Clark *Journal*, "Nov. 19, 1805–Jan. 20, 1806." Lewis and Clark expedition MSS. in the American Philosophical Society, Philadelphia. Reproduced by permission.

FIG. 1.—Page 144 of volume 1, codex C, Clark *Journal*, "Oct. 1, 1804–April 7, 1805." Lewis and Clark expedition MSS. in the American Philosophical Society, Philadelphia. Reproduced by permission.

west of the Mississippi River. Although this message ostensibly was for the purpose of continuing the act for establishing trading houses with the Indians in the West it did request provision for sending an expedition into that area. In his message Jefferson reveals his geographical knowledge of the West as well as his interest in attempting a transcontinental crossing.[10]

> . . . the river Missouri, & the Indians inhabiting it, are not as well known as is rendered desireable by their connection with the Mississippi, & consequently with us. it is however understood that the country on that river is inhabited by numerous tribes, who furnish great supplies of furs & pelting to the trade of another nation carried on in a high latitude, through an infinite number of portages and lakes, shut up by ice through a long season. the commerce on that line could bear no competition with that of the Missouri, traversing a moderate climate, offering, according to the best accounts, a continued navigation from it's sources, and possibly with a single portage, from the Western ocean, and finding to the Atlantic a choice of channels through the Illinois or Wabash, the lakes and Hudson, through the Ohio and Susquehanna, or Potomac or James rivers, and through the Tennessee and Savannah rivers. an intelligent officer, with ten or twelve chosen men, . . . might explore the whole line, even to the Western Ocean, . . . while other civilized nations have encountered great expence to enlarge the boundaries of knowledge, by undertaking voiages of discovery, & for other literary purposes, in various parts and directions, our nation seems to owe to the same object, as well as to it's own interests, to explore this, the only line of easy communication across the continent, and so directly traversing our own part of it. the interests of commerce place the principal object within the constitutional powers and care of Congress, and that it should incidentally advance the geographical knowledge of our own continent, can not but be an additional gratification. The nation claiming the territory, regarding this as a literary pursuit, which it is in the habit of permitting within it's decisions, would not be disposed to view it with jealousy, even if the expiring state of it's interests there did not render it a matter of indifference. . . ."[11]

Congress was favorably impressed and approved Jefferson's request. Accordingly, there was launched the first Federally sponsored and financed exploring expedition.

Thomas Jefferson early in 1803 appointed his private secretary, Capt. Meriwether Lewis, to lead the expedition. Lewis satisfied the requirements of leadership of the expedition admirably, though his formal training in the sciences was inadequate. Jefferson was interested in keeping the ultimate purpose of the expedition secret, for the area into which the expedition was going was at that time French territory. He informed Lewis that ". . . the idea that you are going to explore the Missisipi has been generally given out; it satisfies public curiosity and masks sufficiently the real destination . . ."[12] In this letter he sent Lewis "a copy of the rough draught of the instructions I have prepared for you . . ."

On June 19, 1803, Lewis invited William Clark to accompany him and, with feeling, said, ". . . believe me there is no man on earth with whom I should feel equal pleasure in sharing them [the honors of a successful expedition] as with yourself; . . ."[13] Clark accepted and according to some accounts was commissioned a captain in the Army of the United States.[14]

In June Jefferson completed his final detailed instructions covering the expedition and on the 20th sent them on to Lewis.[15] Jefferson was not yet aware of the purchase of Louisiana, the treaty for the cession of which had been signed at Paris on April 30th, for in his instructions he notes that "the country of Louisiana has been ceded by Spain to France . . ." In these instructions he says, "The object of your mission is to explore the Missouri river, & such principal stream of it, as, by it's course & communica-

[10] For several different points of view as to the reasons for Jefferson's sending an expedition, see: Ralph B. Guinness: "The Purpose of the Lewis and Clark Expedition," Mississippi Valley Hist. Rev. **20:** 90–100. 1933; and Frederick G. Young: "The Lewis and Clark Expedition in American History," Oregon Hist. Soc. Quart. **2:** 410–422. Salem, 1901.

[11] This is quoted from the manuscript original "Document" in the National Archives. Published versions such as those cited in footnote 9 appear not to be accurate transcriptions.

[12] Letter from Thomas Jefferson to Meriwether Lewis dated Washington, April 27, 1803, *Thomas Jefferson Papers*, vol. 132.

[13] Letter from Meriwether Lewis to William Clark, dated Washington, June 19, 1803, *Thomas Jefferson Papers*, vol. 132; and Reuben G. Thwaites: *L and C*, vol. 7, pp. 226–230.

[14] See Olin D. Wheeler: *The Trail of Lewis and Clark*, 2 vols. New York, 1904. Vol. 1, pp. 78–83.

[15] Jefferson's Instructions to Lewis dated Washington, June 20, 1803, *Thomas Jefferson Papers*, vol. 132; and Reuben G. Thwaites: *L and C*, vol. 7, pp. 247–252. The *Thomas Jefferson Papers*, vol. 132, include many notes by Jefferson, some apparently preliminary drafts by Jefferson.

tion with the waters of the Pacific Ocean, may offer the most direct & practicable water communication across this continent, for the purposes of commerce."[16] Jefferson gave specific and detailed instructions as to the kind and frequency of observations of longitude and latitude that were "to be taken with great pains & accuracy, to be entered distinctly & intellibly for others as well as yourself . . ." These instructions concerning most of the then important branches of sciences indicate Jefferson's remarkable comprehension as well as reflect his ability to note clearly the basic requirements of a full picture of the terrain. An examination of the records of the expedition will reveal how well the explorers accomplished the mission. Thomas Jefferson established a precedent for Government-sponsored and financed scientific exploring expeditions and the preparation of adequate instructions for accomplishing the mission.

News of the purchase of Louisiana reached Jefferson on July 1, almost on the eve of the departure of Lewis for the West.[17] This changed the complexion and to some extent the objectives of the expedition. The boundaries of the purchase were obscure, partly because the area never had been clearly defined and largely because so little accurate information was available about the western portion. The United States maintained that the western portion included the drainage basin of the Mississippi and its tributaries and that this should at least include the crest line of the Rocky Mountains. Some claimed that the purchase actually *did* include the Oregon country, though the French diplomat Marbois who had much to do with the purchase stated that ". . . The shores of the Western Ocean were certainly not included in the cession . . ."[18]

On July 4 Jefferson gave Lewis a "letter of general credit" to be used when and if necessary. On the morrow Lewis took leave of Washington. His route carried him through "Frederickstown, Maryland, Harper's Ferry, West Virginia, . . . Charlestown, Frankfort, Uniontown, and Redstone old fort [now Brownsville, Pa.] to Pittsburgh, . . ."[19] The expedition left Pittsburgh on August 31, after an unexpectedly long delay in procuring appropriate equipment, notably a boat.[20] It was early in December before the expedition reached winter quarters at the mouth of the Wood River in Illinois opposite the confluence of the Missouri with the Mississippi. Here the expedition which had been organized as a military detachment, under orders issued by the Secretary of War assembled and prepared for the transect of the continent.

The saga of the Lewis and Clark expedition from the time of its departure from St. Louis on May 14, 1804, to its return to St. Louis on September 23, 1806, has been recounted by many. The best sources, of course, are the official journals, papers, maps, and other records and the published edited version by Reuben G. Thwaites.

TRAINING OF MEMBERS AND ACQUISITION OF SOURCES FOR USE IN PREPARATION FOR THE MAPPING AND GEOGRAPHICAL EXPLORATION OF THE EXPEDITION

It may be said in fairness that no member of the Lewis and Clark expedition was a professionally trained scientist. Perhaps it is to be regretted that Jefferson, with all his professional training, did not require that the party include one or several competent scientists. However, a reading of the Lewis and Clark journals and an examination of their maps reveals that these men quickly learned the fundamentals of observation and description sufficiently well to give us a remarkably clear view of the geographical landscape as well as a reasonably accurate knowledge of where they were in terms of

[16] *Ibid.*, p. 248.

[17] See Hunter Miller: "Treaty for the Cession of Louisiana, Signed at Paris, April 30, 1803 . . .," *Treaties and Other International Acts of the United States of America, vol. 2, Document 28*, pp. 498–511, Washington, 1931. For the original treaty see General Records of the United States Government in the National Archives, Washington, D. C.

[18] For an excellent account of this question see Philip C. Brooks: Diplomacy and the Borderlands: The Adams-Onis Treaty of 1819. Berkeley, 1939. 262 pp.

[19] Letter, Meriwether Lewis to Thomas Jefferson, dated Harpers Ferry, July 8, 1803, *Thomas Jefferson Papers*, vol. 133; Reuben G. Thwaites: *L and C*, vol. 7, p. 256.

[20] For the basic accounts of the voyage down the Ohio see Milo M. Quaife (ed.): . . . *The Journals of Captain Meriwether Lewis and Sergeant John Ordway, Kept on the Expedition of Western Exploration, 1803–1805*. 444 pp. Madison, 1916.

cartographic presentation. Jefferson, aware of the need of trained personnel, was responsible for Lewis's elementary training by several of the scientists in Philadelphia. Lewis must have trained Clark and perhaps several of his men during their winter's stay in Illinois (1803–04) and at Fort Mandan (1805–06).

Lewis's training in the very important activity of taking observations and calculating location as well as mapping, was acquired from one of the best authorities, Andrew Ellicott. Lewis wrote to Jefferson from Lancaster, Pa., that—

> With a view to forward as much as possible, the preparations which must necessarily be made in the Western country previous to my final departure, . . . I have taken the following measures, . . ."
>
> I arrived at this place yesterday, called on Mr. Ellicot, and have this day commenced, under his direction, my observations, &c., to perfect myself in the use and application of instruments. Mr. Ellicot is extremely friendly and attentive, and I am confident is disposed to render me every aid in his power: he thinks it will be necessary I should remain here ten or twelve days.[21]

Jefferson's considerable knowledge of surveying and surveying instruments as well as his ability to use them prompted him to write Lewis on April 30, 1803, that—

> . . . I make no doubt you have consulted with mr. Ellicot as to the best instruments to carry. I would wish that nothing that passed between us here should prevent your following his advice, which is certainly the best. Should a time-piece be requisite, it is possible Mr. Arnold can furnish you one. neither Ellicot nor Garnet have given me their opinion on the substituting a meridian at land instead of observations of time, for ascertaining longitude by the lunar motions. . . .[22]

From these remarks it may be concluded that Jefferson had assisted Lewis in his training. During May, when Lewis was in Philadelphia, he informed Jefferson that—

> In your instructions to me you mention that the instruments for ascertaining by celestial observations the geography of the country through which I shall pass, *have been already provided*; . . . Will you be so good as to inform me what instruments have been provided? and where they are? it may be possible that some instrument has been omitted, which Mr. Patterson, Mr. Ellicott and those gentlemen to whom you have referred me in this place, may deem necessary for me, and if so the deficiency can be supplied in time.[23]

These and similar remarks in his letter indicate his critical attitude toward the need for as well as procuring the best instruments available. He further informs Jefferson in detail concerning the need and use of certain instruments in taking observations and the lack of reliability of, hence no need for, certain other instruments Jefferson apparently had recommended. Jefferson agreed with Lewis in these matters and advised him to get the best time pieces he could and ". . . to be governed entirely by the advice of mr. Patterson & mr. Ellicott: . . ."[24]

Lewis's activity was not limited to training and acquiring equipment, for he endeavored to procure maps and descriptive accounts from sources in Philadelphia, then the map-making center of the country. In his letter to Jefferson on May 25 he mentioned a very significant acquisition:

> You will receive herewith inclosed some sketches taken from Vancouver's survey of the Western Coast of North America; they were taken in a hasty manner, but I believe they will be found sufficiently accurate to be of service in composing the map, which Mr. Gallatin was so good as to promise he would have projected and compleated for me will you be so obliging Sir, as to mention to Mr. Gallatin, that I have not been able to procure Danvill's [D'Anville] map. The maps attached to Vancouver's voyage cannot be procured separately from that work, which is both too costly, and too weighty, for me either to purchase or carry."[25]

[21] Letter, Meriwether Lewis to Thomas Jefferson, dated Lancaster, April 20, 1803, Reuben G. Thwaites: *L and C*, vol. 7, pp. 213–216; see also Catherine Van C. Matthews: *Andrew Ellicott. His life and Letters*, 256 pp. New York, 1908. Especially pp. 212–213.

[22] Letter, Thomas Jefferson to Meriwether Lewis, dated Washington, April 30, 1803, Reuben G. Thwaites: *L and C*, vol. 7, p. 220

[23] Letter, Meriwether Lewis to Thomas Jefferson, dated Philadelphia, May 14, 1803, Reuben G. Thwaites: *L and C*, vol. 7, pp. 221–222.

[24] Letter, Thomas Jefferson to Meriwether Lewis, dated Washington, May 16, 1803, Reuben G. Thwaites: *L and C*, vol. 7, p. 223.

[25] Letter, Meriwether Lewis to Thomas Jefferson, dated Philadelphia, May 29, 1803, Reuben G. Thwaites: *L and C*, vol. 7, pp. 224–225. Mr. Gallatin was Secretary of the Treasury. It is of interest to note that the General Land Office responsible for surveying and mapping the public lands was in the Department and, one might speculate, was responsible for the preparation of this and similar maps for the expedition. Unfortunately, many of the early records of the Department of the Treasury were burned in a fire in 1830 and a search of surviving records reveals no correspondence on this subject.

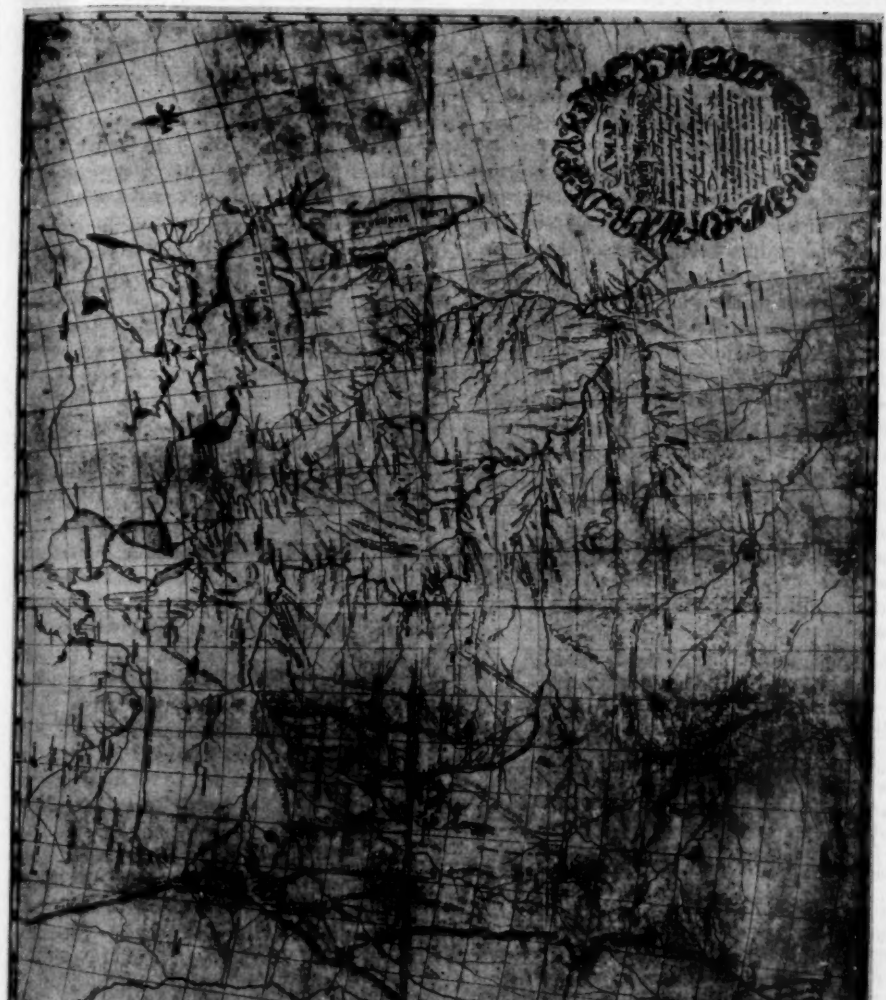

FIG. 3.—"Map of part of the Continent of North America . . . Copied by Nicholas King, 1806," map Ama 21 from the Records of the Office of the Chief of Engineers in the National Archives.

Jefferson and Lewis were aware of the very important surveys by Vancouver and accordingly had a clear picture as to the configuration of the west coast and particularly of Vancouver's description and map of the Columbia River inland for a distance of about 150 miles.

The "Documents Relating to the Equipment of the Expedition"[26] reveal the extent to which Lewis had been able to acquire the best as well as most complete set of instruments for use in mapping and in preparing or drafting maps. One might well conclude that surely such an array of instruments and equipment would not have been approved for the use of the expedition unless Jefferson agreed that they would be used by competent men. Unfortunately, there is no mention in these lists of the maps and descriptive matter with which the expedition must have been furnished.

Jefferson's "Instructions to Lewis"[27] on June 20, 1803, reveal the planning for the expedition and his emphasis on obtaining accurate and frequent measurements. These admonitions included:

> Beginning at the mouth of the Missouri, you will take observations of latitude & longitude, at all remarkable points on the river, & especially at the mouths of rivers, at rapids, at islands & other places, & objects distinguished by such natural marks & characters of a durable kind, as that they may with certainty be recognized hereafter. the courses of the river between these points of observation may be supplied by the compass, the log-line & by time, corrected by the observations themselves. the variations of the compass too, in different places, should be noticed.
>
> Your observations are to be taken with great pains & accuracy, to be entered distinctly, & intelligibly for others as well as yourself, to comprehend all the elements necessary, with the aid of the usual tables, to fix the latitude and longitude of the places at which they were taken, & are to be rendered to the war office, for the purpose of having the calculations made concurrently by proper persons within the United States. . . .

It is interesting to note that nowhere in these instructions does Jefferson specify as to the preparation of maps, though that is implied in his statements about taking and recording observations.

[26] "Documents Relating to the Equipment of the Expedition, May–June 1803," Reuben G. Thwaites: *L and C*, vol. 7, pp. 231–246.

[27] *Thomas Jefferson Papers*, vol. 132, and Reuben G. Thwaites: *L and C*, vol. 7, pp. 247–252. See p. 248.

Lewis and Clark, during their voyage to Fort Mandan, received occasional notes, maps and observations from Jefferson, most of which were of considerable assistance. Shortly after Lewis left Washington, Jefferson sent him an extract of a letter he had received from Comte de Lacépède, a distinguished French naturalist. He included a description of Broughton's voyage up the Columbia River for Vancouver and adds: "from this point Mount Hood is seen 20 leagues distant, which is probably a dependence of the Stony mountains, of which mr. Fiedler saw the beginning at about lat 40° and the source of the Missouri river is probably in the Stony mountains . . ."[28] William Clark in November requested William Henry Harrison, Governor of Indiana and Superintendent of Indian Affairs to search for a certain map. Harrison replied that "The map mentioned in your letter of the 5th Instant had been taken from me by Mr. Jones who claimed it as the property of Mr. Hay of Cahokia but as it was still in the possession of Mr. Jones I have had it copied & now send it to you by the post rider . . ."[29] This may be the sketch map included with Clark's journal notes of April 2, 1804.[30]

Jefferson's further instructions to Lewis on November 16, 1803, included information about several expeditions to be sent into the field, especially several by Zebulon Montgomery Pike and one each by William Dunbar and George Hunter, Dr. John Sibley, and Capt. R. Sparks and Thomas Freeman, during the next several years.[31] Jefferson noted that he felt it very important " . . . to fix with precision by celestial observations the longitude & latitude of the

[28] Letter, Thomas Jefferson to Meriwether Lewis, dated Washington July 15, 1803, Reuben G. Thwaites: *L and C*, vol. 7, p. 258. Mention of "Mr. Fiedler" is of particular interest because Lewis and Clark attempted to follow a copy of a Peter Fidler map, presumably obtained from British traders at the Mandan villages in 1805, but considered to be quite inaccurate.

[29] Letter, William Henry Harrison to William Clark, dated Vincennes, November 13, 1803, Reuben G. Thwaites: *L and C*, vol. 7, p. 280.

[30] See Reuben G. Thwaites: *L and C*, vol. 1, p. 6.

[31] For the original accounts and maps see the records in the War Records Branch and the Cartographic Records Branch in the National Archives.

sources of these rivers, and furnishing points in the contour of our new limits . . ." In November, Jefferson sent Lewis a copy ". . . obtained by myself from Printeau's [Truteau] journal in MS. all of which may be useful to you . . ." A translation of the journal in fuil was sent by Jefferson on January 22, 1804.

Jefferson's letter of January 13, 1804, to Lewis included additional cartographic information:

> . . . I now inclose you a map of the Missouri as far as the Mandans, 12 or 1500 miles I presume above it's mouth. it is said to be very accurate having been done by a mr. Evans by order of the Spanish government, but whether he corrected by astronomical observation or not we are not informed . . .[32]

Dr. Annie H. Abel in 1916 in her article in the *Geographical Review* remarks "That the Indian Office map [recently discovered] is the map that under the name of the Evans map, was transmitted to Lewis by Jefferson as the most satisfactory conclusion . . ."[33] Lewis indicated that the party had a collection of maps for use on the expedition and that when he was in St. Louis on May 2 he had need of them, for he instructed Clark (at their camp on Wood River) to send him ". . . also the case with the maps."[34] Shortly before the party left St. Louis, Lewis sent Jefferson a list of items that Mr. Peter Chouteau was sending Jefferson and which included "A Chart of the Mississippi, from the mouth of the Missouri to New Orleans compiled from the observations of Mr. August [Chouteau? MS. trimmed off at this point]."[35]

CARTOGRAPHIC AND GEOGRAPHIC CONTRIBUTIONS OF THE LEWIS AND CLARK EXPEDITION

Examination of the Lewis and Clark journals and notes reveals the frequency and apparently care with which astronomic and other observations were taken, mapping was accomplished, and the terrain described. A few of the more significant contributions may be pointed out as examples. Lewis and Clark were constructively critical of the cartographic information they had with them as "reliable" sources. On June 16, 1804, Clark notes that ". . . we came to on the S. S. in a Prarie at the place where Mr. Mackey lais down a old french fort, I could See no traces of a Settlement of any kind, . . ."[36] Apparently the reference here is to "Mackay's Table of Distances." Mackay's route is shown on Nicholas King's copy of "Lewis's Map of the Continent of North America . . ." On July 23 while at "Camp White Catfish Nine Miles above the Platt River," Clark noted in his journal that ". . . I commence Coppying a Map of the river below to Send to the P. [President Jefferson] U. S."[37] It may be that this map was sent to Jefferson from Fort Mandan the next spring. This may be the map that Jefferson mentioned in his letter of October 1805 to Andrew Ellicott as "a most accurate map of the Missouri for 1600 miles . . ."

During the winter at Fort Mandan Lewis and Clark prepared maps and completed finished copies of their journals and other papers to be sent to Jefferson. Many contacts were made with traders and Indians and correspondence was carried on, especially with the British factor in the Assiniboine country. Clark in his journal entry for December 16 notes that—

> . . . *Mr. Henny* [Hugh Henney, a British trader] from the [British] Establishment on River Ossinniboin, with a letter from, Mr. Charles Chaboillez one of the Co arrived in 6 days . . .
>
> . . . We found Mr. Henny a Verry intelligent Man from whome we obtained Some Scetches of the Countrey between the Mississippi & Missouri, and Some Sketches from him, which he had obtained from the Indin's to the *West* of this place . . .[38]

With them may have been copies of sketch maps made by Peter Fidler, an employee of note in the Hudson's Bay Company. Lewis and Clark in their journals refer to Fidler's maps from time to time during their

[32] Letter, Thomas Jefferson to Meriwether Lewis, dated Washington, January 13, 1804, *Thomas Jefferson Papers*, vol. 138; Reuben G. Thwaites: *L and C*, vol. 7, p. 291.

[33] Annie H. Abel: "A New Lewis and Clark Map." Geog. Rev. 1: 329–345. 1916. See pp. 342–343. See also footnote 35. This map now is in the Map Division of the Library of Congress.

[34] Letter, Meriwether Lewis to William Clark, dated St. Louis, May 2, 1804, Reuben G. Thwaites: *L and C*, vol. 7, p 299.

[35] "Articles Forwarded to Jefferson," dated St. Louis, May 18, 1804, Reuben G. Thwaites: *L and C*, vol. 7, p. 300.

[36] *Ibid.*, vol. 1, p. 50.

[37] Reuben G. Thwaites: *L and C*, vol. 1, p. 89.

[38] *Ibid.*, pp. 237–238.

journey to the Pacific coast, but generally as being rather inaccurate and misleading.

Apparently Clark sent copies of maps he prepared to other than official sources, for on April 2 he informed Mr. William Croghan that " . . . I must therefore take the liberty of refuring you to my brother to whome I have inclosed a Map and Some sketches relative to the Indians . . ."[39]

One of the most significant maps (Fig. 3) produced by the expedition was the one Clark apparently refers to in his journal on December 18, 1804, at Fort Mandan as ". . . I imploy by Self makeing a Small Map of Connextion &C . . ."[40] and on January 5, 1805, as ". . . I imploy my Self Drawing a Connection of the Countrey from what I have recved . . ."[41] A reproduction of the original of the first quotation is shown in Fig. 1.

On the eve of his departure from the Mandan site Lewis prepared a letter to Jefferson informing him of what he was transmitting to Washington. He noted that—

> Herewith inclosed you will receive an invoice of certain articles, which I have forwarded to you from this place . . . by means of these labels, [on the specimens] reference may be made to the Chart of the Missouri forwarded to the Secretary at War, on which, the encampment of each day has been carefully marked; . . .
>
> I have transmitted to the Secretary at War, every information relative to the geography of the country which we possess, . . .
>
> . . . The map, which has been forwarded to the Secretary at War, will give you the idea we entertain of the connection of these rivers, which has been formed from the corresponding testimony of a number of Indians who have visited that country, and who have been separately and carefully examined on that subject, and we therefore think it entitled to some degree of confidence.[42]

This map has been reproduced and discussed in a number of publications but generally with certain obvious inaccuracies.[43] A reproduction of the manuscript copy by Nicholas King now in the National Archives is shown in Figure 3. However, recent search appears to indicate that in 1825 there was a copy of "Lewis' map of part of Continent of North America, copied in manuscript by Nicholas King; 1805," in the Library of the State Department.[44] It would appear, there-

[39] *Ibid.*, vol. 7, p. 317.

[40] *Ibid.*, vol. 1, p. 238.

[41] *Ibid.*, pp. 244–245. For a printed copy of this map see Elliott Coues (ed.): *History of the Expedition* . . ., vol. 4, New York, 1893, map in pocket. This is *not* a faithful reproduction because the lithographer has taken unwarranted liberties with the original, i.e., instead of using a shading of ink wash to indicate mountains and mountain ranges the Coues' map shows these in caterpillar or hachure markings; degree marks are added to latitude figures that are not on the original; waterlining is used to show hydrography such as lakes and ocean whereas in the original this is but shaded; place names on the original are not included on the Coues' map; and some of the drainage features shown on the original are not shown on Coues' map.

[42] *Thomas Jefferson Papers*, vol. 148; and Reuben G. Thwaites: *L and C*, vol. 7, pp. 318–321. See also *American State Papers: Indian Affairs*, vol. 1, p. 706.

[43] In addition to comments in Thwaites: *L and C* and Elliott Coues: *L and C* see the following:

(a) Jesse Douglas: "Lewis' Map of 1806," Jour. Military Affairs **5:** 68–72. 1941.

(b) Arnold Hague: "An Early Map of the Far West," Science—An Illustrated Journal . . ., **10:** 217–218. November 4, 1887.

(c) Thomas L. Mitchell: "Lewis's Map of the Parts of North America which lie between the 35th and 51st Degrees of North Latitude from the Mississippi and the Upper Lakes to the Pacific Ocean," The Medical Depository, and Review of American Publications on Medicine, Surgery, and the Auxiliary Branches of Science, **9** (and Hexade **3,** 1806): 315–318. 1806.

[44] A Catalogue of the Library of the Department of State . . ., Washington, 1825. 67 pp. For a listing of the map see p. 66. A search of the textual and cartographic records of the State Department in the National Archives and of possible depositories of such records on the Department in 1954 has failed to disclose the existence of this map. The date 1805 as noted in the catalogue probably is an error.

Among the records of the General Accounting Office in Washington, D. C., are Indexes to Ledgers, Ledger Books, Journals, Report Books, and Registers of Warrants which for the period 1803–1807 are a mine of hitherto little-tapped information about the Lewis and Clark expedition. Among these records are two entries in *Report Book D, Jan. 1802–Nov. 1805, Accountants Office*, pp. 509 and 524, respectively, that throw considerable light on the close relationship of Nicholas King to certain of the cartographic products of the expedition:

> "August 22nd 1806
>
> "I certify that there is due Nicholas King One hundred and twenty-six Dollars & twenty five Cents, for Maps and descriptions of part of Louisiana, per account admitted by the Secy of War.
>
> P. H."
>
> "October 17th 1805
>
> "I certify that there is due Nicholas King, Sixty-five Dollars, being the amount of his account admitted by the Secy of War, for the Maps of the Missouri & Tennessee Rivers in August, September & October 1805.
>
> W. S."

The following entry on page 25 of *Report Book E, Nov. 1805–Feb. 1809, Accountant's Office*, is revealing and may tie directly to the so-called King map discussed above:

fore, that there may have been at least two copies of the map, or that Jefferson borrowed the War Department copy, transmitted it to Congress with his Annual Message on February 19, 1806,[45] and when it was returned it was retained in the State Department until it was transferred to the War Department. Nicholas King was a cartographer of note, frequently worked for the War Department and, during the 1790's and the period 1803 to 1812, he was Surveyor of the City of Washington.[46] The question that has not been answered is "Where is Clark's manuscript map that was used by King as a source for his map or maps?" Dr. Samuel I. Mitchell, United States Senator from New York, during this period was much interested in the expedition, and in his article states that the map by Clark had "... been forwarded to the Secretary of War; and, under the direction of Gen. Dearborn, other copies have been made for the inspection of Congress ..."[47] Mitchell states that publication of this map was not to be made until the return of the expedition because "... it is expected that these new facts in geography will form a part, and a most valuable one too, of their book of travels in the west ..."[48] Clark's much more accurate map [now in the Yale University Library], prepared after the completion of the journey, superseded this preliminary version. However, the preliminary version is of considerable value because it portrays the general geographic knowledge of Lewis and Clark before leaving the Mandan site and appears to incorporate portions of Vancouver's charts of the Pacific Coast, Mackensie's maps of the northern interior, and Aaron Arrowsmith's "... Map Exhibiting All New Discoveries in the Interior Parts of North America. London, 1802."[49]

During their journey from Fort Mandan to the mouth of the Columbia River Lewis and Clark prepared maps of the route, took numerous astronomic and other observations and checked the terrain travelled over against such maps and other descriptions as they had acquired before leaving the Mandan site. We find occasional reference by Lewis and Clark in their journals to serious discrepancies in cartographic information at hand, as for example,

> ... Capt. Clark ploted the courses of the two rivers [Maria and Missouri] as far as we had ascended them. I now began more than ever to suspect the varacity of Mr. Fidler or the correctness of his instruments. for I see that Arrasmith [Aaron Arrowsmith] in his late map of N. America has laid down a remarkable mountain in the chain of the Rocky mountains called the tooth nearly as far South as Latitude 45°, and this is said to be from the discoveries of Mr. Fidler ... we did take the liberty of placing his discoveries or at least the Southern extremity of them about a degree further N. in the sketh which we sent on to the government this spring mearly from the Indian information ... and I reather suspect that actual observation will take him at least one other degree further North ...[50]

It is obvious that Lewis and Clark were attempting to reconcile observations with fact and misconceptions of others.

In caches along the route the party left copies of their maps and observations, as for example Clark notes on July 4, 1805, that "... I employ my Self drawing a Copy of the river to be left at this place [Falls of the Missouri] for fear of Some accident in

---

"Accountant's Office
January 25th. 1806

"I certify that there is due Nichs King, One hundred & fifty nine Dollars, being the amount of his account admitted by the Secy of War for making four Copies of Maps transmitted to the War Office by Messrs Lewis & Clark, and expences attending the same in January 1806

W. S."

At least ten different entries in this volume indicate the considerable extent to which King's services were used by the War Department in the preparation and copying of maps, many of which are among the Records of the Office of the Chief of Engineers in the National Archives.

[45] Message from the President to Congress is in 9th Congress, 1st Session, Senate Document 113, a manuscript copy of which (NA-9A-E2) is among the Records of the United States Senate in the National Archives. A copy of the map, if such had been transmitted, does not now accompany these records.

[46] For a short sketch of King see (pp. 62–64) John Stewart: "Early Maps and Surveyors of the City of Washington, D. C.," Proc. Columbia Hist. Soc. **2:** 48–71. 1899; a journal and certain papers of Nicholas King are in the Manuscripts Division of the Library of Congress; a score or more manuscript maps by Nicholas King are among the Records of the Office of the Chief of Engineers and the Records of the Office of Public Buildings and Public Parks of the National Capital in the National Archives.

[47] See Jesse Douglas, *op. cit.*, p. 71; and Samuel L. Mitchell, *op. cit.*, p. 316.

[48] *Ibid.*

[49] For a detailed description of the map and sources see Arnold Hague: *op. cit.*

[50] Reuben G. Thwaites: *L and C*, vol. 2, pp. 131–132. The "sketch" map referred to apparently is the one prepared by Clark and copied by Nicholas King, see footnotes 122 and 123.

advance, I have left buried below the falls a Map of the Countrey below Fort Mandan with Sundery private papers . . ."[51] The expedition's continuous dependence upon the Indians of the regions through which they traveled for information about terrain and Indian settlements is recorded in the journals, as for example Clark said, ". . . I got the Twisted hare to draw the river from his Camp down which he did with great Cherfullness on a white Elk skin . . ." and Clark adds ". . . I precured maps of the Country & river with the Situation of Indians . . ."[52] Copies of Indian-made maps are included in the field notebooks.[53]

The expedition's map collection must have included a copy of Vancouver's map of the Columbia River[54] because when near the mouth of that river "Capt. Lewis concluded to proceed on by land & find if possible the white people the Indians say is below and examine if a Bay is Situated near the mouth of this river as laid down by Vancouver . . ."[55] The party wintered at Fort Clatsop near the Columbia River and during that time Lewis and Clark prepared copies of their journals and maps. Clark in his journal entry for February 14, 1806, notes that he ". . . compleated a *map* of the Countrey through which we have been passing from the Mississippi at the Mouth of Missouri to this place . . . We now discover that we have found the most practicable and navigable passage across the Continent of North America: . . ."[56] Clark describes the principal hydrography and landforms astride the route of the expedition as shown on this map.[57]

The return route to St. Louis in 1806 followed essentially the outgoing route except for several wide detours. Mapping and observations continued to be one of the principal activities of the party.

The records of the Lewis and Clark expedition, as has been the habit of most Government expeditions, unfortunately were scattered and, lacking a precise inventory, except such as may be gleamed from the journals, correspondence, and certain manuscript and published maps, the picture of cartographic and geographic accomplishments must remain somewhat indistinct.[58] However, a number of generalizations may be made and conclusions drawn concerning their accomplishments:

(1) The expedition was eminently successful in accomplishing the basic goal, namely, ". . . to explore the Missouri river, & such principal streams of it, as it's course of communication with the waters of the Pacific Ocean, may offer the most direct & practicable water communication across this continent, . . ."

(2) The broad general physiographic regions through which the party passed between the Mississippi River and the Pacific were recognized and described for the first time and in a surprising amount of identifiable detail.

(3) Lewis and Clark's exploration and description of the so-called Oregon Country were to a large extent responsible for the successful claim by the United States to this area.

(4) The expedition proved the extent and usefulness of a nearly continuous navigable system of waterways between the Mississippi River and the Pacific Ocean but they were destined to be little traveled because more favorable routes were discovered to the south.

(5) A large number of astronomic and other observations were taken and the framework of maps compiled from field surveys was tied into them. However, an examination of these observations reveals that they were at best approximations, especially as to longitude.

(6) Because the maps based on field surveys were tied into inaccurate "celestial observations" they cannot be described as accurate, rather, they are sketches.

(7) The cartographic products include a wealth of detail, especially hydrography and relief, which for the period represent a major contribution and establish Lewis and es-

[51] *Ibid.*, vol. 2, p. 211
[52] *Ibid.*, vol. 3, p. 85.
[53] *Ibid.*, for example vol. 3, p. 102.
[54] See footnote 25.
[55] Reuben G. Thwaites: *L and C*, vol. 3, p. 222.
[56] Reuben G. Thwaites: *L and C*, vol. 4, pp. 70–72.
[57] A facsimile copy of this map (now in the Coe Collection) may be purchased from the Yale University Library, New Haven, Conn.

[58] For details as to the known location of the records of the expedition see footnote 1.

pecially Clark as perhaps better than average cartographers with a high sense of accuracy.

(8) The topographic information assembled, especially in Clark's final large map of the area between the Mississippi and the Pacific Ocean, was a major contribution to the geographic knowledge of Western North America.

(9) Many of the physical features identified and described by Lewis and Clark were given geographic names which have been retained to this date.

(10) A comparison of the Lewis and Clark maps with large scale detailed topographic maps of the United States Geological Survey reveals that at best Lewis and Clark's mapping is sketching rather than surveying because the individual maps lack the precision of field surveying.

Botanical Contributions of the Lewis and Clark Expedition

By Velva E. Rudd (U. S. National Museum)

About 200 herbarium specimens remain as tangible evidence of botanical collections made by Meriwether Lewis in the course of the 2-year long, 1804–1806, Lewis and Clark expedition up the Missouri River, across the Rocky Mountains, down the Columbia River to the Pacific Ocean, and return. Nearly half of the material represents species then new to science, and which were so described by Pursh in his *Flora Americae Septentrionalis*, published in 1814. The narrative of the journals includes descriptive accounts of the vegetation of areas never before seen by white men and of plants used by the Indians as food and medicine, but otherwise unknown.

The primary object of the Lewis and Clark expedition was to explore the Missouri River and related streams with a view toward "the most direct and practicable water communication across the continent for purposes of commerce." In his letter of instruction to Captain Lewis dated June 20, 1803, President Jefferson further directed that he become acquainted with the people along the route, "their ordinary occupations in agriculture, . . . their food," and suggested that "other objectes worthy of notice will be—the soil and face of the country, its growth and vegetable productions . . . Climate, as characterized by . . . the dates at which particular plants put forth or lose their flower or leaf . . ."[1]

[1] BIDDLE, NICHOLAS, *History of the expedition under the command of Captains Lewis and Clark* **1:** xiii–xvi. 1814. Most of the quoted passages in this paper are taken from Biddle's work, since that was the first authentic history of the expedition available to the public.

Lewis conscientiously attempted to collect all such information. Before leaving for the West, he had spent some time at Philadelphia, where he "placed himself under the tutorage of the distinguished professors of that place, who . . . communicated to him freely the information requisite for the purposes of the journey." According to Jefferson, Lewis had a "talent for observation which led to an accurate knowledge of plants and animals of his own country," and "he wanted nothing but a greater familiarity with the technical language of the natural sciences".[2] Presumably, he received his botanical instruction from Dr. Benjamin Smith Barton, professor of natural history in the University of Pennsylvania, and it was to him that Lewis's collections were ultimately sent for examination and report.

The diary of climatic data was begun on January 1, 1804, at the expedition's first winter headquarters, near St. Louis. Entries were made almost daily throughout the trip, with occasional interspersion of such botanical observations as:

April 1 [1804] The spicewood is in full bloom, the dog's-tooth violet, and May apple appeared above ground.

Sept. 19 The leaves of some of the cottonwood began to fade.

23 . . . Plums and grapes fully ripe.

April 10 [1805, at Fort Mandan, North Dakota] . . . The grass begins to spring up, and the leaf-buds of the willow to appear.

11 . . . Many plants begin to appear above the ground . . . the elm, large leafed willow and the bush which bears a red berry is in bloom.

May 2 . . . The snow which fell last night and this

[2] Op. cit. **1:** xii

morning, has not yet disappeared; it forms a singular contrast with the trees which are now in leaf.

9 The chokecherry is now in bloom.

March 13 [1806, at Fort Clatsop, Oregon] . . . The plants begin to appear above the ground, among others the rush, of which the natives eat the root, which resembles in flavor the sweet potatoe.

25 The elder, gooseberry and honeysuckle are now putting forth their leaves; the nettle and a variety of other plants are springing up; the flowers of the broad-leaved thorn are nearly blown; several small plants in bloom.

June 29 The quamash and strawberries are just beginning to bloom at the flats on the head of the Kooskooskee river. The sunflower is also just beginning to bloom, which is two months later than those on the sides of the western mountains near the falls of the Columbia.

July 20 [Along the Yellowstone River, Montana] . . . The grasshoppers are extremely numerous and have destroyed every species of grass from one to ten miles above on the river, and a great distance back.[3]

The general aspect of the vegetation was well described in the narrative of the journals, as indicated in the following examples.

Progressing northwestward up the Missouri River, it was noted that the trees became scarcer, growing only along the streams.

We made ten miles to a wood on the north, where we encamped [July 29, 1804]. The Missouri is much more crooked, since we passed the river Platte, though generally speaking, not so rapid; more of prairie, with less timber, and cottonwood in the low grounds, and oak, black walnut, hickory, and elm.

July 30 . . . The land here consists of a plain, above the highwater level, the soil of which is fertile, and covered with a grass from five to eight feet high, interspersed with copses of large plums, and a currant, like those of the United States. It also furnishes two species of honeysuckle; . . . Back of this plain, is a woody ridge about seventy feet above it, at the end of which we formed our camp. This ridge separates the lower from a higher prairie, of a good quality, with a grass, of ten or twelve inches in height, and extending back about a mile, to another elevation of eighty or ninety feet, beyond which is one continued plain . . . At a distance, varying from four to ten miles, and of a height between seventy and three hundred feet, two parallel ranges of highland affords a passage to the Missouri, which enriches the low grounds between them. In its winding course, it nourishes the willow islands, the scattered cottonwood, elm, sycamore, lynn, and ash, and the groves are interspersed with hickory, walnut, coffeenut, and oak.

[3] Op. cit. **2**: 495–522.

July 31. The meridian altitude of this day made the latitude of our camp 41° 18′ $1\frac{4}{10}$″.[4]

Approaching the Rocky Mountains, the party, on May 20, 1805, reached the mouth of the Muscleshell River.

We have seen for a few days past [timber] which consists of nothing more than a few straggling small pine and dwarf cedar, on the summits of the hills, nine-tenths of the ground being totally destitute of wood, and covered with a short grass, aromatic herbs, and an immense quantity of prickly pears: though the party who explored it for eight miles represented low grounds on the river as well supplied with cottonwood of a tolerable size, and of an excellent soil.[5]

Crossing the Bitterroot Mountains the route was steep and rocky.

"Sunday 15 [September, 1805]. At an early hour we proceeded along the right side of the Kooskooskee [Clearwater] over steep rocky points of land . . . and began to ascend a mountain; but the fire and wind had prostrated or dried almost all the timber on the south side . . . we reached the top of the mountain. . . . All around us are high rugged mountains, among which is a lofty range from southeast to northwest, whose tops are without timber, and in some places covered with snow . . . three hours before daybreak,

Monday 16, it began to snow, and continued all day, so that by evening it was six or eight inches deep. . . . The road was, like that of yesterday, along steep hill sides, obstructed with fallen timber, and a growth of eight different species of pine. . . .[6]

West of the Bitterroot Mountains lay the Quamash flats, important because of the abundance of edible *Camassia* bulbs.

Tuesday 10 [June, 1806] . . . We encamped on the bank of a small stream, in a point of woods, bordering the extensive level and beautiful prairie which is intersected by several rivulets, and as the quamash is now in blossom, presents a perfect resemblance of lakes of clear water. . . . The country through which we passed is generally free from stone, extremely fertile, and supplied with timber, consisting of several species of fir, long-leafed pine and larch. The undergrowth is chokecherry, near the water courses, and scattered through the country, black alder, a large species of red root now in bloom, a plant resembling the pawpaw in its leaf, and bearing a berry with five valves of a deep purple color. There were also two species of sumach, the purple haw, seven bark, serviceberry, gooseberry, the honeysuckle, bearing a white berry, and a species of dwarf pine,

[4] Op. cit. **1**: 36, 37.
[5] Op. cit. **1**: 221. 222.
[6] Op. cit. **1**: 449, 450

ten or twelve feet high, which might be confounded with the young pine of the long-leafed species, except that the former bears a cone of a globular form, with small scales, and that its leaves are in fascicles of two resembling in length and appearance the common pitch pine. We also observed two species of wild rose, . . . both quinquepetalous, both of a damask red colour, and similar in the stem; but one of them is as large as the common red rose of our gardens; its leaf too is somewhat larger than that of the other species of wild rose, and the apex, as we saw them last year, were more than three times the size of the common red rose.[7]

Agriculture was scarcely more than incidental among the Indians encountered by the expedition. Along the Missouri River below Fort Mandan, a few crops, chiefly corn, beans, squashes, watermelons, and tobacco, were planted, and more or less cultivated, by the squaws. Otherwise, subsistence was based on gathering the wild plant and animal products.

The native plants which the Indians, and the expedition, relied upon as staples were described in some detail by Lewis, since such information would be of importance to future travelers in the region.

Some of the plants apparently most important were: *Sagittaria latifolia* Willd. (wappatoo, wapato), *Camassia quamash* (Pursh) Greene (quamash, camas), *Lewisia rediviva* Pursh (bitterroot), *Ribes* spp. (currents, gooseberries), *Rubus* spp. (raspberry, salmonberry), *Prunus* spp. (plum, chokecherry), *Amelanchier* spp. (Juneberry, serviceberry), *Psoralea esculenta* Pursh (Indian breadroot, pomme blanche), *Amphicarpa bracteata* (L.) Fern. (hog peanut, ground bean), *Lomatium cous* (S. Wats.) Coult. & Rose (cous, biscuitroot), *Gaultheria shallon* Pursh (shallon, salal), *Helianthus tuberosus* L. (Jerusalem artichoke). Mention is made of the Indian custom of using cottonwood twigs as feed for horses, especially during the winter.

Samples of edible and medicinal plants were collected for scientific study, but often the material, such as bundles of roots, etc., were unrecognizable as to source unless other, more complete, specimens were available. Some association can be made on the basis of Lewis' descriptions and present knowledge of plants in the area.

[7] Op. cit. **2**: 311, 312.

Seeds and roots of a number of the specimens were planted, mostly in the Philadelphia area. In a few cases the herbarium specimens may actually be offspring of seed collections made at the original locations cited by Lewis.

An ear of Indian corn and some Ricara tobacco seed sent to Jefferson from Fort Mandan was referred to by Pursh: "but one of those [varieties of Indian corn, *Zea mays* L.] brought by M. Lewis, Esq. from the Mandan nation, on the Missouri, deserves particular attention, as it ripens sooner and produces as excellent ears as any sort I know. It would be calculated to cultivate in climates not quite so warm as all the other sorts require,"[8] and "the tobacco [*Nicotiana quadrivalvis* Pursh] prepared from it is excellent. The most delicate tobacco is prepared by the Indians from the dried flowers." He cites "v.v.; v.s. in Herb. Lewis nec non Nuttall."[9]

Material of the golden currant, *Ribes aureum* Pursh, apparently was successfully brought back and propagated. In connection with the original description of the species, Pursh states, "v.s. in Herb. Lewis; v.v. in Hort."[10]

Lewisia rediviva Pursh, behaved in rather spectacular fashion, inspiring its specific name. "This elegant plant would be a very desirable addition to the ornamental perennials since, if once introduced, it would be easily kept and propagated, as the following circumstance will clearly prove. The specimen with roots taken out of the Herbarium of M. Lewis, Esq. was planted by Mr. McMahon of Philadelphia, and vegetated for more than one year: but some accident happening to it, I had not the pleasure of seeing it in flower."[11]

The successful collection and preservation of the herbarium specimens presented a greater problem than the mere recording of observations or wrapping of seeds and roots.

At present, only about 200 herbarium specimens collected by Lewis are known to be extant, located at the Academy of Natural Sciences of Philadelphia. What per-

[8] PURSH, FREDERICK, *Flora Americae Septentrionalis:* 46. 1814.
[9] Op. cit.: 141, 142.
[10] Op. cit.: 164.
[11] Op. cit.: 368.

centage of the original total is represented can not be known. Apparently no separate record of collections was kept, the data being placed with the specimens, probably on the enclosing paper.

The earliest dated collection is an *Equisetum* and bears a faded label in Lewis's handwriting: "no 21 [or 31] growth of the sand bars near the banks of the river—taken the 10th of August 1804." At that date the party was on the Missouri River at about latitude 42° N. It is not known whether any plants were collected farther downstream or whether there was a shipment of specimens before the spring of 1805. An herbarium-sheet of *Shepherdia argentea* Nutt. [= *Hippophaë argentea* Pursh] has the notation, in Lewis's hand, "no. 39 A. obtained at the mouth of the River Quiccoure [Niobrara River, September 5 or 6, 1804] . . . Some plants are sent down by barge to the care of Capt. Stoddard at St. Louis."

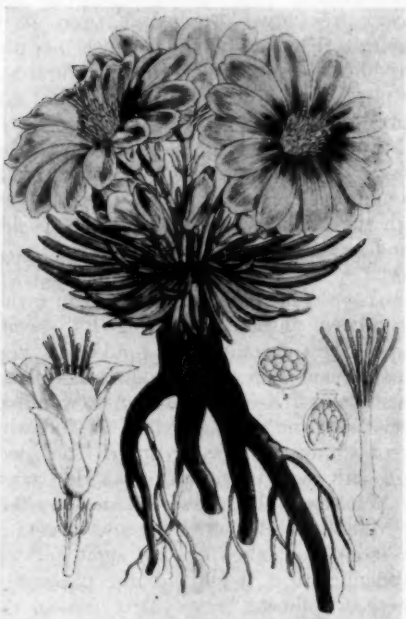

FIG. 1—*Lewisia rediviva* Pursh. Copy of plate 5395, Curtis's Bot. Mag., 3d ser., **19**: 1863. This apparently was the first published illustration of *Lewisia*. The text accompanying the plate states: "We have at length the satisfaction of giving a figure, from a living plant, of *Lewisia rediviva*, or *Spat'lum* of the Indians of North-west America, of which hitherto little has been known, save what is derived from dried specimens: and in so succulent a plant the distinguishing characters are very apt to be fallacious. The specific name, "*rediviva*", is given by Pursh in consequence of the root, long preserved in the herbarium, and apparently dead, having been planted, revived in a garden in Philadelphia."

In April 1805, before leaving Fort Mandan [North Dakota], the expedition dispatched specimens, papers, etc., to President Jefferson. The shipment included two bundles of dried plants, one with numbers 1–60, the other 1–67. It is not known whether the two bundles represent duplicates, or a total of 127 collections. The numbering was not done chronologically, nor is any systematic order apparent. The material at Philadelphia is distributed on about 50 herbarium sheets and represents about 36 collections, 26 of them numbered, 10 unnumbered. According to records of the American Philosophical Society, a set of plants collected by Meriwether Lewis, numbered 1–62, were deposited with the Society on November 15, 1805. Because of the date, that set would be a part of the lot sent to Jefferson from Fort Mandan.

From Fort Mandan to the head of the Kooskooskee [Clearwater] River, the collections were essentially a total loss due to their being left overwinter, unsuccessfully, in caches in the ground. Only two specimens, both mere twigs, bear the dates of that period, and apparently are the only relics.

Of the 150 or so remaining specimens, a few were collected in the vicinity of Fort Clatsop [Oregon], the third winter headquarters, but most were gathered on the return trip.

Some, or all, of these later collections were given to the American Philosophical Society for study by Dr. Barton. There, in Philadelphia, they became available to Frederick Pursh, who was preparing a *Flora* of North America. In 1811 Pursh went to London to complete his work, taking with him a number of the Lewis specimens, especially those that were new to him and that he wished to study further. In London he worked under the patronage of Sir A. B. Lambert, and eventually the Lewis specimens he had with him became a part of the Lambert herbarium.

The specimens left in Philadelphia remained in the custody of the American Philosophical Society. In 1842, specimens of the Lambert set were purchased at auction by Edward Tuckerman and in 1856 were presented to the Academy of Natural Sciences, according to a letter of transmittal in the library of the Academy.

In 1896 Thomas Meehan began a search for the almost forgotten collections of the Lewis and Clark expedition. He found the specimens among the effects of the American Philosophical Society, somewhat damaged by beetles, but generally in fair condition. Since the Society did not maintain a herbarium, the material, in 1897, was deposited with the Philadelphia Academy.

Meehan made preliminary determinations of the resurrected specimens and then turned them over for correction to Drs. B. L. Robinson and J. M. Greenman of the Gray Herbarium. In 1898 he published a list of all the plants in the collection with the determinations by Robinson and Greenman, as well as the citations from Pursh's *Flora*.[12] This was followed by a paper by Coues,[13] which chiefly added geographic notes.

More recent discussion of the status of the Lewis specimens was by Pennell,[14] in 1950. He mentioned that the collection was being assembled as a unit, rather than leaving the sheets distributed in systematic order throughout the general herbarium. That task is now essentially completed and the specimens are available for critical study. A number of the sheets bear annotations by recent monographers, and gradually the type specimens are being recognized and so designated.

The seasonal observations, the descriptions of the vegetation, and the notes on important plants must have been especially interesting and useful at the time of publication, and for some years thereafter. Such information extended the scope of knowledge in general, and, specifically, briefed travelers as to conditions to be met in the region.

[12] MEEHAN, THOMAS. Proc. Acad. Nat. Sci. Philadelphia. 1898: 12–49.

[13] COUES, ELLIOTT. Proc. Acad. Nat. Sci. Philadelphia. 1898: 291–315.

[14] PENNELL, FRANCIS W. Proc. Amer. Philos. Soc. **94**: 137–151. 1950.

Scientifically, however, such data seem to have been less used than Pursh's *Flora*. Probably the first writer on plant geography to have access to information on the United States Northwest was Charles Pickering, who read a paper "On the Geographical Distribution of Plants" to the American Philosophical Society in Philadelphia, on October 19, 1827. In his published paper,[15] Pursh's *Flora* is cited as a reference, and a map of North America shows Fort Mandan. Otherwise, there is no mention of the Lewis and Clark expedition.

A later paper, by J. G. Cooper,[16] "On the Distribution of the Forests and Trees of North America," lists as one of about 50 "authorities consulted in collation of the facts . . . Lewis and Clarke's Travels, (Pursh Botany)."

As the region has become better known, the value of the early data is chiefly historical.

The major botanical contribution of the expedition was the collection of herbarium specimens, which form an original and permanent record and which were available to Pursh for consideration in his *Flora*. About 80 of the Lewis sheets at Philadelphia may be type material. In a few cases a Lewis collection was cited by Pursh in the original description of a new species, but a collection by Menzies or Nuttall was designated as the type. The collections of species already known to science were of value in that they represented considerable extension of range.

Following are some of the species, now commonly known, that were first collected by Lewis and described as new by Pursh:

Scientific Names	*Common Names*
Agropyron spicatum (Pursh) Scribn. & Smith	Bluebunch wheatgrass
Zygadenus elegans Pursh	Death camas, poison camas, white camas
Erythronium grandiflorum Pursh	Glacier lily, yellow fawn lily
Fritillaria pudica (Pursh) Spreng.	Yellow fritillary, yellow bell
Calochortus elegans Pursh	Mariposa
Eurotia lanata (Pursh) Moq.	Winter sage, winter fat
Lewisia rediviva Pursh	Bitterroot

[15] PICKERING, CHARLES. Trans. Amer. Philos. Soc., new ser., **3**: 274–284, 1830.

[16] COOPER, J. G. Ann. Rept. Smithsonian Inst. for 1858: 246–280. 1859.

Berberis aquifolium Pursh	Oregon holly grape, holly leaved Mahonia
Cleome serrulata Pursh	Rocky Mountain bee-plant
Ribes aureum Pursh	Golden currant
Rubus spectabilis Pursh	Salmonberry
Purshia tridentata (Pursh) DC.	Antelope-brush
Lupinus argenteus Pursh	Silvery lupine
Psoralea esculenta Pursh	Indian breadroot, pomme blanche
Linum lewisii Pursh	Wild flax, prairie flax
Euphorbia marginata Pursh	Snow-on-the-mountain
Acer circinatum Pursh	Vine maple
Acer macrophyllum Pursh	Big-leaved maple, Oregon maple
Ceanothus sanguineus Pursh	Northern buckbrush, snowbrush
Sphaeralcea coccinea (Pursh) Rydb.	Scarlet mallow, copper mallow
Clarkia pulchella Pursh	Clarkia
Nicotiana quadrivalvis Pursh	Indian tobacco
Grindelia squarrosa (Pursh) Dunal	Resinweed, gumplant
Balsamorrhiza sagittata (Pursh) Nutt.	Balsamroot
Artemisia cana Pursh	Silver sage, dwarf sagebrush

Had a professional botanist accompanied the party, a more complete and important collection might have been made. (Originally a French botanist, André Michaux, was to have made such a trip but was recalled by his government.) On the other hand, Lewis's specimens and data are as ample, or no more inadequate, than many collections made today by persons with considerable botanical training. The accidental losses of specimens placed in caches would not necessarily have been prevented. Apparently it was understood that Lewis was to avoid collection of material already known, for Jefferson mentions that one of Lewis's qualifications was the fact that he would be "guarded, by exact observation of the vegetables and animals of his own country, against losing time in the description of objects already possessed".[17]

Considering such restrictions and the inconveniences and accidents of the journey, one wonders that so much material resulted.

I wish to express my appreciation to Dr. C. Earle Smith, Jr., of the Academy of Natural Sciences of Philadelphia, for his courtesy and helpfulness in making available the Lewis collections and various pertinent data.

[17] Biddle, op. cit., **1**: xii.

Zoological Contributions of the Lewis and Clark Expedition

By Henry W. Setzer (U. S. National Museum)

The Lewis and Clark expedition was primarily charged with making geographical observations of the country through which it passed in search of a route to the Pacific as well as to evaluate the possibilities of the, then recent, Louisiana Purchase. The secondary charge was to determine the possibilities of trade and the kinds and numbers of people living on the route. Almost as an afterthought was added "other objects worthy of notice," among which was the charge: "The animals of the country generally, and especially those not known in the United States" (Coues, 1893: xxviii).

As a result of this latter charge, the expedition, in spite of the constant press of travel and geographic observations, made a collection of the larger animals. A shipment to President Jefferson was made on April 4, 1805 from the Lewis and Clark winter camp at the Upper Mandan Village on the Missouri River. It was to be returned to St. Louis, and then dispatched to the President, by some of the original party who had finished their tour of duty. This shipment of crates, bales, and boxes sent to Jefferson contained, in natural-history specimens, "a stuffed male and female antelope with their skeletons, a weasel, three squirrels from the Rocky Mountains [probably Black Hills], the skeleton of the prairie-wolf [coyote], those of the white and gray hare, a male and female blaireau or burrowing dog of the prairie [badger], with a skeleton of the female, two burrowing

squirrels [prairie dog?], a white weasel, the skin of the louservia [bobcat or lynx], the horns of the mountain ram or bighorn, a pair of large elk horns, the horns and tail of the black-tailed deer, and a variety of skins such as those of the red fox, white hare, marten, and a yellow bear obtained from the Sioux" (loc. cit.: p. 250). Other boxes contained Indian articles, plants, insects, and birds. In addition to the preserved material a burrowing squirrel, a prairie-hen and four magpies were sent alive. No report has been found that any of the living animals ever reached St. Louis. Other material was brought by the Expedition when it returned in 1806.

This material was received by Jefferson who kept some of it on display at Monticello and sent the rest of it to Peale's Museum in Philadelphia. The first report, linking the vernacular name as applied by Lewis and Clark with a scientific name, was by George Ord in Guthrie's Geography published in 1815 and based on material in the Peale Museum. The names for mammals proposed by Ord and which are still tenable are: *Ursus horribilis*, grizzly bear; *Arctomys ludovicianus* = *Cynomys ludovicianus*, black-tailed prairie dog; *Arctomys columbianus* = *Citellus columbianus*, Columbian ground squirrel; *Antilope americana* = *Antilocapra americana*, pronghorn; and *Mus cinereus* = *Neotoma cinerea*, bushy-tailed wood rat.

In 1817 Rafinesque in the American Monthly Magazine published descriptions of three more mammals based on the descriptions as given by Lewis and Clark but without ever having seen the specimens. Those were: *Felix* (*sic*) *fasciatus* = *Lynx rufus fasciatus*, bobcat; *Anisonyx rufa* = *Aplodontia rufa*, sewellel; and *Cervus hemionus* = *Odocoileus hemionus*, mule deer.

The birds were first studied and reported by Wilson, who named several, which have since proved to be synonyms of earlier existing names. In the same Guthrie's Geography, Ord described *Phasianus columbianus* = *Pediocetes phasianellus columbianus*, Columbian sharp-tailed grouse, and *Anas columbianus* = *Cygnus columbianus*, whistling swan. Others described by him at the same time have since proved to be synonyms.

The fate of the Lewis and Clark specimens has been rather tragic. For many years they were on view in the Peale Museum in Philadelphia, but owing to financial difficulty the Museum was sold at auction and the material passed into the hands of P. T. Barnum and others. So far as is known, most, if not all, of the material obtained by Barnum was lost in several disastrous fires. Some of the bird specimens from the old Peale Museum did find their way into the Museum of Comparative Zoology, where they are still extant. This material plus a few types at Vassar and the Academy of Natural Sciences of Philadelphia are all that remains of the Lewis and Clark animals. A paper by Faxon (1915) gives a list of these specimens and comments on their condition. When we consider the time at which the Expedition was made and the difficulty entailed in transportation, it is remarkable that any material was saved and more remarkable that any of it managed to reach the United States for study.

The contributions made by the Lewis and Clark expedition in zoology are remarkably slight when one considers the scope of their geographical and ethnological contributions. It must be borne in mind though that both Lewis and Clark were engineers and that they had no professional zoologist with them on their journey. Had such an individual been along, the contribution to the zoology of what is now the western United States would have undoubtedly been as great as that in geography and ethnology.

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The Contributions of Lewis and Clark to Ethnography

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I

Lewis and Clark were good social scientists. They were the unappreciated forerunners in a tradition of field research that led to the recognition of the superiority of American field work and the establishment of a sound science of ethnology. The explorers benefited from the fact that the frontier was close at hand and the Indians were easily available for study yet at the same time relatively untouched by acculturative influences. They dealt with the Indians in a pragmatic and egalitarian manner rather than as aloof colonial administrators. Indeed, they were often dependent upon the Indians for their very survival. But Lewis and Clark were more then military men and frontiersmen. They took careful note of information that had little bearing upon whether Americans would be able to live off the land or establish trading relations with the tribesmen. They were conscious of their role as social observers, collecting cultural data for scientific purposes. In pursuing these purposes they respected the rights and property of the Indians even at the cost of the objectives of the expedition. In proper ethnographic style they consistently identified sources of their information and distinguished between data obtained from a member of the subject tribe as compared to that given by neighboring tribesmen. They recognized the Indians as their intellectual equals and they did not ascribe cultural differences to innate characteristics. Lewis, chosen by Jefferson as leader for the expedition, was a man who on the one hand had a mind geared to social scientific analysis and on the other was capable of "applying" anthropology in its most modern sense. The nascent development of a purposeful social science was present in the researches carried out by him and his co-leader, Clark.

II

The bulk of the ethnographic material from the Lewis and Clark expedition appears in the journals proper. Full collation and organization of these data were planned as a postexpedition project, but this was never completed. We have, as a consequence, only a few tables and topical treatments to supplement the diaries. The explorers directed their attention to the same objectives in both the journals and the analytical treatments: first, the expansion, in Government interests, of the fur trade in the newly acquired Louisiana Territory, until then primarily the commercial province of Spanish and British traders; second, response to the felt need for information of a specifically scientific type. The latter however, was not without its practical side. Emphasis was placed on the physical sciences, particularly pathology, physical typology, medicine, botany, and geography. Toward this end the explorers not only made observations but they studied and questioned the Indians at considerable length. They consequently obtained ethnographic subject matter of the first importance, including both descriptive data and information on the character of knowledge possessed by the Indians in such fields as natural environment, concepts of territory and political boundaries, natural resources, and seasonal rounds of activities. A remarkably comprehensive list of questions regarding the Indians was issued in Jefferson's letter of instructions to Lewis and also in a detailed outline of subjects believed to have been compiled by Jefferson but of which the only remaining copy is a manuscript in Clark's handwriting (**7:** 248–249, 283–287).[1]

The task of organizing the field notes was begun during the expedition. It was continued on the first day after return but was soon interrupted. The materials completed for the Eastern Indians (**6:** 80–120) reveal the names by which tribes and their

[1] All citations are to *Original journals of the Lewis and Clark Expedition.* Edited by Reuben Gold Thwaites. 8 vols. New York, 1904–1905.

subdivisions were known to themselves and to other tribes and whites, the size and changes observed in population of groups, characteristics of tribal leadership, the current state of their trade with whites and their disposition toward the increase of such commerce the areas claimed and occupied by various groups and other information that might be of value in extending the fur trade. Lewis began the writing of a full account of the fur trade with recommendations to the Governmental based upon analysis of historical developments and inherent problems (**7**: 369–388), but less attention was given to the tabulation of ethnographic data. The treatment of topics of direct ethnographic import was somewhat naive and phenomenalistic, but the categories used and their subdivisions did cover the aspects of culture now recognized as standard points of reference for cultural data, including religion, social organization, economics, and technology. Also, consideration was given to certain classes of data that have received extensive attention only in relatively recent ethnological studies: leisure pursuits, warfare, and even psychological interests reflected by the heading "Relative to Morals," in which the question was raised, "Do they ever resort to suicide under the influence of their passions, particularly love?" (**7**: 283–287). Linguistic data were collected on the basis of a prepared word list, but all that remain, apart from tribal and personal names and a few terms for plants and animals, are passing references to Lewis having obtained Indian vocabularies, and a copy of the English words for which native equivalents were sought.

Of the nearly 100 topics listed for investigation, practically all were dealt with at some point in the journey. However, no one tribe was described completely in terms of these specific subjects, nor was the material unrelated to the fur trade arranged according to them. The explorers generally provided copious notes on physical types, prevalence of certain diseases and other pathological conditions, and, above all, excellent descriptions of economics and technology. Where the party lingered for extended periods, such as at Fort Mandan, among the Shoshone and Nez Percé, and at Fort Clatsop, their descriptions are accordingly more extensive and detailed. This is not to say that they took full advantage of their opportunities, even where they had the benefit of good interpreters as among the Shoshone, nor were their observations particularly methodical. It is possible that many special field notes were lost, but we doubt that this was the case, except for the vocabularies. It is probable that all the general cultural data were written into the journals.

Of the two leaders, Lewis was the more visual-minded and the more capable of describing what he saw in minute and accurate detail. A search of Lewis's daily accounts will reveal exactly how the Shoshone dressed, how nets were constructed along the Columbia River, the manner of disposal of the dead among the Nez Percé, and thousands of other such descriptions. In most instances, the pictures were drawn in words. While Clark was a fair draftsman, neither explorer could be described as an artist, and the number of sketches portraying anthropological subject matter is very limited and of poor quality.

But the explorers' descriptions of aspects of material culture are time and again equal or superior to accounts in modern ethnographies. Even Clark usually provided adequate general portrayals supported by technical details. In the descriptions of the great wooden houses of the lower Columbia, for example, information is provided on shape and orientation, materials used and construction methods, the disposition of rooms, sleeping quarters, passageways and entryways, and the like. Furthermore, specific measurements were made, and we are given all important dimensions in terms of feet. New descriptions were recorded each time a variation of construction appeared as the explorers progressed, even though the new or different features were slight. For example, seven separate descriptions of houses appear in 80 pages of the journals covering the return journey between the Lewis River, Wash. and Celilo Falls, a distance slightly over a hundred miles (**4**: 223, 240, 255, 259, 269, 280, 304). Included are data on the first occurrence of underground houses and the character of

these, an important ethnological consideration.

Information on graves and burial grounds is likewise full. In writing of the Upper Chinook near Portland, Oreg., Lewis first pointed out that in comparison with their downriver neighbors this tribe differed "in the manner of interring their dead. they lay them horizontally on boards and cover them with mats, in a valt formed with boards like the roof of a house supported by forks and a single pole laid horizontally on those forks. many bodies are deposited in the same valt above ground. they are frequently laid one on the other, to the hight of three or fo[u]r corps. they deposit with them various articles of which they die possessed, and most esteem while living. their canoes are frequently broken up to strengthen the vault" (**4:** 224). Additional descriptions, some fuller, some more meager, appear almost as frequently as those for house forms (see, e.g., **4:** 270, 369).

The data which the journals contain on canoe types are sufficient to serve as a basis for a comparative study of the canoes of western America. A short passage relating to a minor canoe form observed near the mouth of the Willamette River is interesting because it provides, as do many such descriptions, related details of ethnographic significance:

> Observed small canoes which the women make use of to gather wappato & roots in the Slashes. those canoes are from 10 to 14 feet long and from 18 to 23 inches wide in the widest part tapering from the center to both ends in this form [a crude illustration appears here] and about 9 inches deep so light that a woman may with one hand haul them with ease, and they are sufficient to carry a woman and some loading. I think 100 of these canoes were piled up and scattered in different directions about in the woods . . . those canoes were the property of the inhabitents of the Grand rapids who used them ocasionally to gather roots [**4:** 236–237].

Discussions of religion and social organization are both less complete and less reliable than information dealing with economics and material culture, because of the difficulties of communication, the explorers' lack of methodological training, and their cultural biases. Where Lewis could express hearty admiration for the elegant costumes of the Shoshone, marvel at the technical skill displayed by the coastal Indians in woodworking and basketry, and taste various Indian delicacies with the empirical appreciation of a gourmet, he could make only superficial comments on the important religious concept of *medicine*: "All unacountable thing[s] with the Indians of the Missouri is called *Medicine*" (**2:** 177).

Perhaps Lewis was a bit too self-consciously "scientific" in that his remarks regarding *medicine* reflect in several instances an impatience with the Indians who did not seek to account for certain phenomena, such as the rumbling noises heard in the Rocky Mountains, in what Lewis would consider a rational or realistic manner.

Clark, too, encountered supernatural explanations in his attempts to obtain information on the location of villages and shifts in population. We may be grateful that he incorporated such data into his notes as he received them. Thus we see him pursuing his research among the Mandan: "I set my self down with the bigwhite man Chiefe and made a number of enquiries into the tredition of his nation as well as the time of their inhabiting the number of villages the remains of which we see on different parts of the river, as also the cause of their evacuation." The chief provided the origin myth of the Mandan, leading thence to an orderly account of the villages as he knew them in his childhood, and finally to the explanation that the Sioux and smallpox had been responsible for so great a decimation that only a single village remained (**5:** 347).

The spotty and disconnected character of the data on social organization is due, perhaps, as much to the peculiar categorization in the outline that was provided as a guide for the explorers as to factors earlier mentioned. Despite all handicaps, however, Lewis and Clark recorded many bits of information in this field that are of special value to ethnologists because it is today too late to obtain data of a comparable character. Incidental comments are frequent on such subjects as marriage customs, family organization, and ceremonial life, but we find almost no purposeful examination of these topics. The organization and leader-

ship of political units are often discussed, but caution must be exercised in the use of these data. From the first, Lewis and Clark carried three classes of medals to be given to head chiefs and first and second subchiefs. They also set about "making" chiefs, that is, awarding medals indicative of the fact that power now derived not only from tribal sources but also from the Federal Government. They consistently awarded medals on the basis of what we fear were preconceived notions of a hierarchy of power. However, they were not blinded to the fact that all was not as they anticipated; they learned that leadership varied both in form and function from place to place. While Lewis mentioned a head chief among the Shoshone, and two of inferior status, he observed that—

> each individual is his own sovereign master, and acts from the dictates of his own mind; the authority of the Cheif being nothing more than mere admonition supported by the influence of which the prop[r]iety of his own examplary conduct may have acquired in the minds of the individuals who compose the band . . . in fact every man is a chief, but all have not an equal influence on the minds of the other members of the community, and he who happens to enjoy the greatest share of confidence is the principal Chief [**2**: 367, 370].

The organized and tabular material on political organization that appears in volume 6 undoubtedly reflects some knowledge the explorers had borne in mind but had not recorded and as a consequence this presentation is more impressive than the textual passages. However, in use, these tables should always be checked against the text because there are contradictions and variations of phrasing and in such cases the text is always the safer guide. Also, the tables contain some entries that are repetitive of others and the band and tribal designations are frequently overlapping or fortuitous.

This leads us to the question of the problems that the ethnologist faces in the use of data from Lewis and Clark. The first consideration is that the researcher must at all times be sensitive to the difficulties under which the explorers worked in the acquisition of the material and to use it with appropriate caution. It must be borne in mind that the ethnographic investigations were carried out by military men pursuing a primarily political objective, under harrowing physical conditions, and without previous training in any sense adequate to the task. The investigational responsibilities of the explorers were extremely broad; ethnography was only a part. Lewis received some training in botany and other natural sciences in preparation for the trip, but there was no one to instruct the explorers in even the rudiments of ethnological science. As is true of ethnographers today, the explorers had to make scientific observations of subjects which, unlike rocks or shrubs, can talk back and even object violently to being studied. We should naturally expect the geographic and botanical data gathered by Lewis and Clark to be more uniformly of professional quality than their ethnography, especially since the Indians were not merely scientific subjects to them but fellow human beings with whom they had to get along; indeed, upon whom they had to depend for their very existence. It was necessary to communicate with them, to overcome their suspicions, and, in some instances, to placate them—all the while attempting to record full and objective accounts of their modes of life. The modern ethnographer feels a real sympathy with Lewis when he notes the comment of a trader whom the explorers met: "As the Indians could not well comprehend the intention of recording their words, they concluded that the Americans had wicked designs upon their country" (**1**: 227, fn. 2).

No difficulty was greater than that presented by the language barrier. The student using the journals must remember that most of the data in the journals were gathered through the unsatisfactory mediums of sign language, the Chinook jargon, or interpretation through two or more languages before reaching English. Even when the explorers could rely upon the celebrated Sacagawea and her husband, Toussaint Charboneau, they were at a disadvantage in that Charboneau was neither an educated nor a very perceptive person, and translations were hampered by the fact that his first language was French. In other instances, as among the Flathead, Clark

noted, "Spoke to them (with much dificuel[t]y as what we Said had to pass through Several languages before it got into theirs, . . .)" (**3:** 53). From the Flathead to the Pacific coast the explorers had adequate interpretive assistance only for the Shoshone. Sign language and jargon permitted fair communication of concrete concepts but precluded discussion of the fine points of ceremonialism or social organization.

The resultant difficulties for the social scientist who uses the materials of Lewis and Clark could be illustrated with any one of hundreds of terms. We have chosen an extreme example, which shows not only the problems but also the rewards attendant upon successful analysis. The term is Towanahiooks, also rendered as To-wannah'-hi'-ooks, Towarnahiooks, To wor-ne hi ooks, and the like. In the paper by Ray on "Tribal Distribution in Northeastern Oregon" (Amer. Anthrop. **40:** 384–395. 1938), a critical question was the relationship, in territorial and martial terms, of the Sahaptin tribes of the Columbia River and the Northern Paiute to the south. The Paiute were referred to by Lewis and Clark as the Shoshone, from their language, or the Snake, a sign language term for the Shoshone, Bannock, and Paiute tribes collectively. "Shoshones" were described by the explorers as residing in various areas east of the Cascade Mountains and, in several citations, also west of the Cascades on the Multnomah[2] River. Ray asserted that the assignment of the upper Willamette to the "Shoshone" was surely an error and pointed out that in the passage in Lewis and Clark on which the assumption apparently was based the Multnomah was said to be southeast of the point on the Columbia where the explorers were situated whereas actually it was to the southwest. He dismissed the matter with the comment that it was quite possible that the enemy was the Molale.

This summary dismissal, it is now clear, was much too hasty. Further collation and analysis of data from the journals have revealed a complex web of confusion and error, perhaps as serious as any therein, but nonetheless resolvable through the application of historical and ethnological techniques.

On the outward journey, as the explorers approached Celilo Falls, Clark wrote: ". . . we discovered the enterence of a large river on the Lard. Side . . . this River haveing no Indian name that we could find out, except 'the River on which the Snake Indians live', we think it best to leave the nameing of it untill our return" (**3:** 146). The native name is not mentioned. Clark continued: "we proceeded on pass[e]d the mouth of this river . . . .at *two* miles below this River passed Eight Lodges on the Lower point of the Rock Island aforesaid at those Lodges we saw large logs of wood which must have been rafted down the *To wor-ne hi ooks* River, below this Island on the main Stard. . . .the lower point of one Island opposit which heads in the mouth of *Towornehiooks* River which I did not observe untill after passing these lodges about ½ a mile lower passed 6 more Lodges on the Same Side and 6 miles below the upper mouth of *Towornehiooks* River the commencement of the pitch of the great falls, . . ." (**3:** 147). The great falls is Celilo.

Thus we learn, through careful analysis, that the Towanahiooks is a double-mouthed river, today called the Deschutes, and the upper mouth is that of the stream which was spoken of as the river "on which the Snake Indians live." Instead of being left nameless, it is now and subsequently called the Towanahiooks, but without specific or obvious reference to the river earlier mentioned. Thus the confusion begins.

The explorers had reached the point on the Columbia where Sahaptin dialects give way to Chinookan. Phonetically the term Towanahiooks appears to be Sahaptin, and it is ascribed to the Sahaptin "Eneshur" by Lewis, but Clark's journal for the same day states that the word is used by both the Chinook and Sahaptin: "this river is called by the Skillutes & Eneshure Nations Towannahhiooks which is also the name they call those bands of Snake indians who come on the river every spring to catch C[s]almon" (**4:** 363–364, 366). The explorers encountered the word again down-

[2] Wherever the word Willamette or Multnomah appears, the reference is to the same river, the one called Multnomah by Lewis and Clark, but today known as Willamette.

river in definitely Chinookan territory. This suggests that the term might have been current in the *lingua franca* of the region, Chinook jargon. The matter must be resolved by field inquiries.

In any event, it is clear that the term was used to refer to both the "Snake" Indians and the Deschutes River, the long, lower course of which was the territory of the Sahaptin Tenino. It is unsafe to assume, without analysis, that the reference in any particular place is specifically to the Indians or to the river, even when the basis is a statement such as the one already cited in which Columbia River Indians are said to call the people of the upper Multnomah Towanahiooks, or, as in Codex I: "Sho-Shone (or Snake indians) residing in Winter and fall on the Multnomah river . . . and in Spring and summer on the heads of the *To-war-nehi-ooks* . . . and more abundantly at the falls of the Towarnehiooks . . . ." (**6:** 118). It is unsafe because the word Towanahiooks is, of course, "Snake." The above quotation, paraphrased, reads, "Shoshone or Snake Indians residing. .on the head of 'the river on which the Snake Indians live,' and all other such passages are comparably ambiguous or redundant. This point would be less significant if it were not for the numerous languages encountered in the area and the consequent multiplication of possible sources of error. As noted, Lewis and Clark had crossed the Sahaptin-Chinookan boundary line. Clark explained: "our two old chiefs expressed a desire to return to their band from this place, Saying 'that they could be of no further Service to us, as their nation extended no further down the river than those falls. (*they could no longer understand the language of those below the falls, till then not much difference in vocabs.*)'" (**3:** 152). The explorers were now faced with Chinook, an exceedingly difficult language spoken in numerous dialects along a relatively short portion of the Columbia River. A few miles on either side of the river other languages—indeed, other stocks—were spoken. Trade at Celilo, the Dalles, and on the lower river was carried on by the linguistically heterogeneous participants largely by means of the Chinook jargon, a trade language highly developed in the Northwest. The jargon contained words from numerous stocks in the area, including, of course, the Chinook language proper. It seems certain that most of the intercourse between Lewis and Clark and the Indians of the Columbia below The Dalles was carried on by means of the jargon, but the explorers do not distinguish between the *lingua franca* and the Chinook language proper. We know that Lewis and Clark depended upon Sahaptin rather than the jargon above the Dalles—the remarks about the "old chiefs" tell us that—and this fact lends weight to the assumption that The Dalles was the approximate eastern boundary line of the jargon area. The Indians of the lower river would naturally have spoken to the travelers in jargon and it would not have taken them long to become reasonably conversant in this simplified language. It is strange that the journals do not give us specific data on the subject, especially considering Lewis and Clark's interest in the native languages, but it must be remembered that the vocabularies collected have never come to light. Another possibility, and a very real one, is that the explorers did not know that they were dealing with a synthetic language; that they assumed that they were employing the native language of the Chinook. This would be less surprising than the error which Lewis and Clark made in assuming that the Sahaptin language is related to the Salish. Clark wrote: "They call themselves *Cho pun-nish* or *Pierced noses* Their diolect appears verry different from the flat heads, [*Tushapaws*], altho origineally the Same people, . . . " (**3:** 78; see also **3:** 128, **4:** 224, 273, 363).

Sacagawea was of no service here, of course; even less her husband, Charboneau. When near the present town of Portland, Oreg., Clark noted that she was unable to converse with a Shoshonean slave whom they encountered (**3:** 193). The obvious explanation is that she and the slave spoke mutually unintelligible dialects of Shoshonean. It may be noted parenthetically that Sacagawea was unable to speak Sahaptin—Nez Percé informants declare that this was so, and we have noted nothing to the contrary in the journals—and therefore

had been of no linguistic aid to the exploring party since they reached the habitat of the Nez Percé in the Rockies. In fact, when the Nez Percé were first encountered, Clark wrote that "we attempted to have Some talk with those people but could not for want of an Interpreter thro' which we could Speake, we were Compelled to converse alltogether by Signs" (**3**: 85).

The Chinook jargon, adequate for trade, was hardly adapted to the unambiguous handling of a problem such as that presented by the term Towanahiooks, especially when the language was newly and hurriedly acquired and used under trying conditions. Added to this was the further confusion that the "Snake" river here involved was not the Snake River proper, the principal tributary of the Columbia, down which the explorers had travelled to reach the Columbia.

The problem facing Lewis and Clark, therefore, was to discuss with Sahaptin and Chinookan informants, by means of the jargon, the habitat of distant Shoshonean peoples, all the while using the same word for the Indians and for two separate rivers on which they lived, but not exclusively. More than that, at a point on the Columbia near where the Shoshonean slave was encountered, the explorers had occasion to talk about still another river which they called the Snake, and also about snakes, the reptiles, which were abundant in the vicinity. This river was the tributary of the Columbia which is now known as the Lewis River of the state of Washington. It was first noted by Clark, who wrote of "... a small river which the Indians call *Châ wâh-na-hi-ooks*." (**4**: 212) Lewis wrote of the "Clan-nah-min-na-mun nation" (**3**: 213). Clark's term was merely a variant spelling for Tawanahiooks; Lewis's was sufficiently distinctive phonetically to suggest that it was a different word, belonging to the language proper, not jargon. But the Biddle text renders Lewis's words as "the Towahnahiook nation," which is to say "the Snake nation." Lewis himself identified the river as the "*Cah-wah-na-hi-ooks*" (**4**: 214), that is, "Snake" river or "river on which the Snake Indians live." In Codex I the entry is: "Quath-lah-poh-tle's. N. reside on the N.W. of the Columbia above the Enterence of *Cah-wah-na-hi-ooks* river. . . . " (6: 117, undoubtedly Clark).

At the same time that Clark firs mentioned the "Snake" (Lewis) River of Washington, he also commented upon the large number of snakes in the vicinity. We are not told, however, whether the river received its name because of this fact. This Lewis River is not, of course, the same as that to which the explorers gave the name Lewis, the latter being the Snake River proper.

But we have not yet exhausted the ramifications of the term Towanahiooks and its variants. On the return journey Lewis's first reference to the Deschutes River is to a village "a little below the entrance of Clark's river (*Towanahiooks*). . . . " (**4**: 310). For a time Clark continues to call the river Towanahiooks but later adopts Lewis's term honoring him. Thus was carried out the explorers' earlier declaration that they would name the river on the return journey, but no explanation to this effect appears in the journals.

The preceding year, when the travelers were camped on the Middle Fork of the Clearwater River just above the confluence with the North Fork, Clark stated, on the basis of Nez Percé information, that "a large river which falls in on the NW. Side and into which the *Clarks river* empties itself is 5 Sleeps" (**3**: 85). Presumably this is the Columbia at its confluence with the Snake, or with the Okanogan, River (see **3**: map opp. p. 130), rather than the Deschutes (Clark; Towanahiook), which would better fit the description; the latter was not given the name Clark River until April 21, 1806. But on May 6, 1806, Lewis wrote: "The river here called Clark's river is that we have heretofore called the Flathead river, I have thus named it in honor of my worthy friend and fellow traveller Capt. Clark. . . . the stream which I have heretofore called Clark's river had its three principal sources in the mountains Hood . . . . this river I shall in the future call the To-wanna-hiooks. . . ." (**4**: 363–364).

It is at this same point in the journals that Lewis and Clark give contradictory information as to the tribal origins of the word Towanahiooks and Clark speaks of

the same word being used for both the Indians and for the river (**4**: 366).

In the light of the varied and contradictory uses of this term it is easy to see what led to the explorers' errors in placing the "Snake" Indians on the upper Multnomah. All their information on this subject was obtained from Columbia River Indians whose languages were totally unrelated to those spoken by the people resident in these distant areas. Presumably the mediums of communication were sign language or Chinook jargon. Clark's notion, at least, of the location and extent of the headwaters in question was much distorted. He observed that "a great portion of the Columbia and Lewis's [Snake] river and between the same and the waters of California must be watered [drained] by the Mulnomah river" (**4**: 308).

Clark is also responsible for a statement which epitomizes the confusions involved in the use of terms and, coupled with other evidence, provides the key to the puzzle. The remark was written while the explorers were in Chinookan territory near Portland, Oreg.: "a canoe arrived from below the last rapid with . . . a woman whome had been taken prisoner from the Snake Inds. on Clarks River [*on a river from the South which we found to be Mulknoma*]." The only "Clarks" or "Clark" river entering Shoshonean territory which could possibly be confused with the Multnomah is the Deschutes. It is true that the journals do not show the term Clarks River in use until the Deschutes was encountered on the return journey, but some time had elapsed since it was first discovered and we can only conclude that the explorers had in the meantime decided upon this name as a designation that they would use for the "nameless" river. The bracketed words, a postexpedition emendation by Clark, reflect the confusion which was apparently already characteristic when, at Fort Clatsop, Codex I was written. There we find the statements already quoted locating the "Shoshone or Snake" Indians on the headwaters of the "Towanahiooks and Multnomah;" also the following: "Sho-bar-boo-be-er Band of Shoshones reside on the S.W. side of the Multnomah river, high up the Said river." This would place the "Snake" Indians not only west of the Cascades but west of the Calapooya Mountains, or about sixty miles from the Pacific Coast! The Codex also lists "Sho-Sho-ne's on the Multnomah and its waters, the residence of them is not well known to us. or Inds.-of-the Columbia say abt. 6,000 [souls]" (**6**: 119).

We may now accept the following points as being safely established: The river called Multnomah or Mulknoma by the explorers is the modern Willamette; the Towanahiooks is the Deschutes; Clark's River, when located in north-central Oregon, is also the Deschutes; the Chawanahiooks is a river flowing south into the Columbia in western Washington; Towanahiooks and Chawanahiooks are variants of a term, probably from Chinook jargon, which means "snake"; the explorers applied the unmodified term not only to the two distinct and distant tributaries of the Columbia but also to the "Shoshone or Snake" Indians; the Indians referred to were the Northern Pauite; this tribe lived on the headwaters of the "Snake" River which is now the Deschutes and Sahaptins (Tenino) lived on the lower course; Chinookan and Salishan peoples lived on the "Snake River," which is now the Lewis; the Snake River proper, major tributary of the Columbia, was the home of Sahaptins on the lower portion, Shoshoneans, including the Northern Pauite, on the upper portion; the explorers confused the Willamette River, in references to its headwaters, with the Deschutes; the headwaters of the Willamette, contrary to Lewis and Clark, was not the home of the Northern Paiute or any other tribe of "Snake" Indians.

As stated earlier, the term Towanahiooks was chosen for analysis because it illustrates many aspects of the problem facing the anthropologist when he attempts to use the ethnographic data from Lewis and Clark. We repeat that this is an extreme case. Were it not so, it is doubtful that ethnologists in any number would ever tap the riches left by the explorers; the refining process would be too costly. But the fact is that the purer ore has not generally been mined, either. We think that the reasons are twofold: first, anthropologists have been

ethnohistorically-minded only to a very limited degree until recently; second, the problems encountered in Lewis and Clark are generally of the kind illustrated by the term Towanahiooks, and, even though the ramifications be fewer, the task of analysis is still a formidable one. Perhaps a third point should be made. The explorers' journals present numerous puzzles that can never be solved until field work be done by an ethnolinguist on the identification of those terms—place names, tribal names, cultural references, and the like—which are transcribed in phonetics so distorted as to defy analysis with the aid of internal evidence alone. It can be stated on the basis of some experience that such field analysis is highly practicable; if the task be not easy at least the work is highly rewarding.

III

Having given attention to the character of the information gathered by the explorers and to some of the problems involved in its use, we may turn to a consideration of their methods, attitudes, and the reliability of their work. We must judge their research in terms of the objectives of the expedition; these have already been discussed. And we must remember that their work was not completed. The postexpedition phase was sharply curtailed by a series of unfortunate incidents, including the early death of Lewis. As a consequence, the character of the organized data for the eastern and the western tribes differs greatly. The writing up of information on the eastern tribes was fuller, the quality of the data gathered for the western tribes was higher. There was apparently no concerted effort made to fill out the prepared schedule for each tribe nor any rechecking for the purposes of filling gaps. It appears that the explorers recorded on the schedules those of their absorbed impressions and observations which were pertinent. They acted more as an independent ethnographic team among the western Indians, and it is to their credit that the quality of their work, as reflected in the daily accounts, improved.

It is clear that not all their observations were transcribed, and consequently, as is often the case with modern ethnologists, some of their generalizations and analyses must be assessed without benefit of documentation. They tended to take certain matters for granted, such as the prevalence of menstrual seclusion and did not inquire as to the cultural rationale.

The explorers made categorical distinctions between the tribes from one region and another, which serve as checks upon later ethnological research and resultant generalizations relating to the traits distinguishing culture areas. The characterizations made generally conform, as a matter of fact, to present day views. They set up, in effect, three culture areas: the Plains, Plateau, and Northwest Coast. These are, of course, physiographic as well as culture areas, but Lewis and Clark established them as the latter, categorizing on the basis of cultural personality or character. They did make some generalizations about "all Indians" but greater emphasis was placed upon regional characteristics. The Plains people were suspicious, treacherous, warlike; the Plateau, mild, generous, happy, and hospitable; the Northwest Coast, untractable, sharp, and competitive—given to driving hard bargains. The explorers had not the time to set down detailed accounts of Plains coupcounting, Plateau pacifism, or Northwest Coast economic exchange, but they did perceive the essence of the differences of outlook of the peoples of the three areas.

Lewis ascribed some of the hostile traits of the Plains to contact with the whites. But he noted that when, in the interests of the fur trade, he counseled peace among the warring tribes, he met with what he recognized as a curiously logical objection. The elderly chiefs were quite willing to forego war, having won their laurels, but a young man asked how they would have chiefs, once the old men were dead, if peace prevailed, "taking it for granted that their could be no other mode devised for making Cheifs but that which custom had established through the medium of warlike ac[h]ievements" (**3**: 30).

In the Plains, at Fort Mandan, and on the coast, at Fort Clatsop, Lewis and Clark

naturally had a different basis of dealing with the Indians than in the Plateau. In the forts they were outsiders, protecting themselves by observing strong military precautions. But during their extended stay in the Plateau, especially among the Nez Percé, they were living with the Indians. Being short of supplies, they were forced to barter for food or, not infrequently, to live on the largess of the tribesmen. Thus, as participant observers with excellent rapport the conditions for sound ethnographic research were nearly ideal. It might be argued that these facts were responsible for the markedly different conclusions reached regarding "national character" in the three areas. However, Lewis and Clark did not characterize the Plains and Northwest Coast Indians as of identical nature, in contrast to the Plateau tribes. Both groups were harder to get along with than the Plateau people, but for different reasons: the Plains people were physically aggressive, the Northwest Coast groups difficult and unpleasant in commerce. Also, when the party spent an extended period among the Shoshone, a Basin group with a Plains overlay, field conditions were not unlike those with the Nez Percé. Here they even had the benefit of Sacajawea's services as interpreter and her influence in the tribe as a blood relative of a chief. But Lewis's characterization of this culture differed markedly from his assessment of the Plateau. It is true that he extolled the virtues of the Shoshone as generous, kindly, and contented but only after he had become well acquainted with them and after their suspicions had been allayed that the Americans were in league with the Shoshone's enemies. Lewis was annoyed but not surprised that he could not trust the promises of the Shoshone, and he mentioned that their initial reaction to strangers was one of mistrust and hostility.

Not so in the Plateau. These tribes greeted the party unarmed and hospitably. Or they took flight rather than to risk hostility, being ignorant of the motives of the explorers. As frontiersmen who knew their Indians and as scientists who took great interest in the phenomena they observed, Lewis and Clark discerned a point of deep ethnological significance when they distinguished the three culture areas.

As an example of Lewis's generalizations in a more restricted field, we may cite his notation of a correlation between prestige or equality for women and the sharing of responsibility for the food quest. He found the status of women to be proportionately lower where they merely processed food obtained primarily by men (**3**: 315). He consistently saw the significant points in masses of data and presented them effectively in brief compass. (See, e.g., the succinct summary of the seasonal round of activities of the Shoshone, **2**: 373–74.)

In the field of applied anthropology, Lewis collected data on tribal distributions, leadership, and market values. In his suggestions to the Government he pointed out that a strong show of arms would be necessary, especially in the Plains, for the Americans to enter the fur trade, but the use of these arms would be less effective in controlling the Indians than would be peaceful means. He recognized that the Indians had become completely dependent on the whites for certain "necessities," and it was his opinion that, given adequate government control over the traders, the threat of Indian hostility could be effectively countered simply by withholding such goods.

Lewis and Clark were one with modern social scientists in judging cultural differences to be the result of learning, not the consequence of innate characteristics of intellect varying from race to race. They also recognized individual traits of personality to be due to training, not biological inheritance. They were not above value judgments of physical types, using the ideal of beauty in their own culture as their basis of comparison. But they drew no analogies of physique and temperament.

The explorers recognized the Indians as their intellectual equals. Lewis made it eminently clear that he considered them as capable of drawing logical conclusions regarding their own best interests as any white man. He and Clark felt that the Indians would eventually have to become "civilized." But if they found the Indians ignorant at times, they did not consider them

stupid. Furthermore, they were quite ready to respect the Indians as superior in certain accomplishments, admiring particularly their technological skills.

In their relationships with the Indians we find Lewis and Clark observing modern ethnographic precautions and ethics. These are first noted in the directions issued to them by Jefferson, but they also stand out in the policies enunciated by the explorers as they pursued their journey. They were to treat the natives "in the most friendly & conciliatory manner which their own conduct will admit; allay all jealousies as to the object of your journey, satisfy them as to it's innocence. . . ." (7: 250). Throughout the course of their trek, the explorers attempted to respect the Indians' caches of food and wood, admonished their men not to lose their tempers with the Indians, and, at least, to observe local proprieties in the matter of relations with women. The explorers realized that they could not prevent their men from indulging themselves with the "tawney damsels," and if they felt any outrage of morals they at the same time were grateful that custom among many of the tribes did not require strict continence of their party, a condition that would have upset discipline and possibly led to hostility by the Indians. In such cases practical experience as military leaders tended to take the place of ethnological relativism in matters of sex, so that discussions of adultery and similar topics are scarcely tinged by the cultural bias that so often appears in the accounts of nonscientists who take note of such subjects.

Although the explorers frequently gave vent to their feelings about the Indians in their writings and anticipated treachery in even the friendliest encounters, only one instance occurred in the whole course of the journey where the party was compelled to kill Indians in self-defense. This alone is indicative of their adherence to Jefferson's instructions and of a noteworthy restraint on the part of men whose training and experience were largely military in nature. Even though the explorers maintained an outward policy of detachment we know that their emotional responses to the Indians were strong because they wisely noted their reactions in the journals.

The personalities of the explorers, as revealed in their writing, were important factors in their success as ethnographers. They were outgoing, receptive, tolerant, and genuinely humanitarian. Consequently we have the greater faith in the authority of their observations and comments. A particularly good example is found in their ministrations to Plateau Indians during their return trip. They were able to "reward their informants" with medical aid, a useful device for developing good will providing the patients have faith in the medicines, and that they survive. The Indians tended to regard Clark's ministrations more highly than he did himself. The journals for this period contain the oft-repeated sentiments of the explorers that they wished they could be even more helpful to these admirable people. These sentiments, doubtless sensed and appreciated by the Indians, must have gone a long way to achieve what a few drops of laudanum or eye-water alone could not accomplish. Under such conditions it is unlikely that the Indians would mislead their friends or withhold information from them.

IV

To indicate the extent to which the journals have been used by anthropologists —or rather, neglected—and to suggest the scope of the ethnographic resources therein, both realized and potential, we offer a few examples. These are taken from the western area only, first, because it is generally agreed that the ethnographic contributions of the explorers were considerably greater for the West than for the East, and second, to keep this section brief.[3]

The groups most extensively treated by Lewis and Clark were the Nez Percé, Wishram-Wasco, and the Lower Chinook. No major ethnography has been written for

[3] Also, because we are best acquainted with the western region. Lurie has been engaged for many months in ethnohistorical work on the area. Ray's ethnographic work and checking of Lewis and Clark data in the field have been restricted to the region west of the Rocky Mountains.

the Nez Percé but Herbert J. Spinden published the results of a brief field study in 1908 (*The Nez Perce Indians*, Mem. Amer. Anthrop. Assoc. **2**: 165–274). His original data were sketchy, and many sections could have been expanded greatly and improved through inclusion of the excellent data in Lewis and Clark. However, Spinden made only a few scattered references to the journals and neglected quantities of significant data.

Moving downriver, the principal tribes next encountered are the Walula, Umatilla, and Cayuse. When ethnographies appear for these groups—work is now underway—they will be full or meager depending upon the extent to which the data from early sources, particularly Lewis and Clark are used. These data, while not great in quantity, are of the first importance qualitatively. If the colorful tribe the Cayuse is ever presented ethnographically it will have to be principally on the basis of ethnohistorical materials, again with emphasis on Lewis and Clark, because this culture virtually disappeared years ago.

The Tenino, below the Umatilla, are well represented in the Lewis and Clark pages, but the information is discouragingly confused, owing to the geographic and linguistic puzzles encountered by the explorers in this region. G. P. Murdock's intensive study of this tribe remains in field-note form. When it is published it will simplify greatly the task of untangling the Lewis and Clark material, which will then prove a valuable supplement to the field data.

In the vicinity of The Dalles were located the Chinookan Wishram and Wasco, the former the subject of one of the major ethnographies of the area (Leslie Spier and Edward Sapir, *Wishram ethnography*, Univ. Washington Pub. Anthrop. **3**: 151–300. 1930). Lewis and Clark did not remain long in this area, but their extensive and penetrating observations were focused upon significant cultural traits. Spier used the explorers' data on village and tribal locations, as presented by Hosmer, and made a few further references to passages in this abbreviated edition of the journals. Presumably he did not have the Thwaites edition available. The complexities of the ethnographic observations for this area, as reported in the original journals, are comparable to those noted for the Tenino. When these complexities have been resolved, valuable additions to our knowledge of the Wishram will be the reward. These additions will be the more welcome because The Dalles was the dividing line, in the Columbia Valley, between the Northwest Coast and the Plateau. It was a favored gathering place of peoples from both of these culture areas, and the greatest trading center on the river above its mouth.

A partial analysis of the explorers' data for the Umatilla-Tenino-Wishram region was made by Ray in 1936 to help resolve the controversy over the Teit hypothesis of recent Salish-Sahaptin-Shoshonean movements. The Lewis and Clark data supported fully the conclusions reached by Murdock, Blyth, Steward, Ray, and others on the basis of field research. The combined evidence finally disposed of the Teit hypothesis; at least, no one has come to its support in the intervening sixteen years. (Verne F. Ray et al., *Tribal distribution in eastern Oregon and adjacent regions*, Amer. Anthrop. **40**: 384–415. 1938.)

Franz Boas's work on the Lower Chinook was done prior to the appearance of the Thwaites volumes, but Ray leaned heavily upon the observations of the explorers for the content of his ethnography (*Lower Chinook ethnographic notes*, Univ. Washington Publ. Anthrop. **7**: 29–165. 1938). Indeed, over a hundred references to the journals appear in his footnotes, and nearly all these are citations for substantive data in the ethnography. Here is a case where it had been assumed for over 40 years that the tribe was extinct and that no field work could be done. When, to the ethnographer's delight, two usable informants were found, fragmentary data were recovered. The extensive commentaries of Lewis and Clark, who spent a winter in the vicinity, were used exhaustively as supplementary information, and the result was that we have an ethnography for this important tribe, which, while brief, is nevertheless enriched by scores of observations of 1805–1806 dates.

With the above as examples of the value of the Lewis and Clark materials, the

question naturally arises as to what can be done to insure that the contributions of these ethnographic pioneers be not further neglected. We have already stated that some field checking and amplification are essential. Then, all the ethnographic data in the journals should be analyzed, the contradictions resolved wherever possible, all geographical and tribal references rendered in modern terms, and a running account, following the day by day organization of the journals, should be prepared. In the interests of economy in research this task should be divided into two parts, one covering the area east of the Rocky Mountains, the other west, and one or a few persons only should work on each part. The only alternative is for each researcher to do the job over again, at least insofar as it be required for his area of interest, whenever a new ethnographic project is pursued. Such duplication of effort and waste of valuable research time is something that we should, as social scientists, have corrected by now.

William Clark: Pioneer Museum Man

By John Francis McDermott (Washington University, St. Louis, Mo.)

[EDITOR'S NOTE: Meriwether Lewis's tragic death occurred on October 11, 1809, barely three years after the return of the voyage of discovery. William Clark served with distinction as Superintendent of Indian Affairs at St. Louis from 1807 until his death on September 1, 1838. He was Governor of Missouri Territory, 1813–1821. Clark's continued interest in science is best illustrated by his establishment and maintenance of the first museum west of the Mississippi River. This museum, built in 1818, occupied a brick structure about 100 feet long and 30 feet wide, attached to the south end of his residence on the southeast corner of Vine and Main Streets. The building also served as a council chamber where Clark met members of the many Indian delegations who came to St. Louis to confer with him.

Dr. McDermott's present article has been extracted from his paper, *Museums in early Saint Louis*, published in the Bulletin of the Missouri Historical Society **4**(3), St. Louis, 1948. We are indebted to the author and to Charles van Ravenswaay, Director, Missouri Historical Society, for permission to reprint this account of William Clark's Museum.]

In the early West science manifested itself most obviously in the museums, public and private, that sprang up in every place of a few thousand inhabitants. Educated men took an interest in science and the phenomena of the world about them. Even though they made no pretense to knowledge or skill, they were sufficiently well read and curious enough to collect representative specimens and strange objects.

There is no evidence that any of the early French inhabitants of St. Louis seriously attempted to establish a private museum; the objects they picked up in their travels and in their contacts with the Indians they gave away freely. The first St. Louis resident to make a collection was William Clark, who began his on the famous expedition made with Lewis. Certainly his position for many years as Indian agent for the tribes west of the Mississippi gave him ample opportunity to increase his collection. For many travelers passing through St. Louis in those years Clark's museum was a regular tourist stop, since the Governor, as Paxton expressed it in his *St. Louis Directory* (1821), was "so polite as to permit its being visited by any person of respectability at any time." No doubt as Henry Vest Bingham had thought three years earlier, that "verry Civil Gentleman" must have been "Much plaughed By the Visits of Strangers" (Windell, 1946, p. 184).

Nevertheless, he seems to have had the normal delight of a collector in displaying his acquisitions.

When on his first visit to the West in July 1818, Henry Rowe Schoolcraft went to see the museum which he found "arranged with great taste and effect. . . . The collection of numerous splendid indian dresses, warlike instruments, skins of remarkable animals, minerals, fossil-bones, and other rare and interesting specimens" (School-

craft, 1819, p. 241). Three years later, back in St. Louis for the second time, he paid another visit to Clark and his museum. Interested in all branches of natural history, Schoolcraft was pleased to note again that Clark "evinces a philosophical taste in the preservation of many subjects of natural history, together with specimens of Indian workmanship, and other objects of curiosity collected upon the expedition . . . We believe that this is the only collection of specimens of art and nature west of Cincinnati, which partakes of the character of a museum, or cabinet of natural history." Schoolcraft at this time was particularly interested in geology and pointed out that "among the specimens which pertain to minerology of the country, there are several very fine and large geodes of quartz, lined with crystals and amethyst. These were procured on the river *des Moines*, of the Upper Mississippi. Gov. Clark also showed us specimens of granular and foliated gypsum from the Konza (Kansas)" (Schoolcraft, 1825, p. 294).

In 1823 another scientific visitor (Paul of Wurtemberg) made an observation which may help to account for the ultimate disappearance of the collection. After a brief mention he declared it "very complete and most of its objects, especially the costumes of the tribes of the far west deserve to be painted and described." Then he added: "It is extremely unfortunate that vermin will in a short time destroy the best pieces, especially the beautifully embroidered animal skins" (Wurtemberg, 1938, pp. 214–215).

Not long after this two other European travelers recorded their impressions at some length. Levasseur, Lafayette's secretary, in 1825 declared that the French party visited the museum.

> . . . with the greater pleasure from its being shown by Mr. Clark. . . . Specimens of all the clothing, arms and utensils for fishing, hunting and war, in use among the various tribes living on the sources of the Mississippi and the Missouri, are here to be found. Among the articles commonly worn by Indian hunters, collars made of claws of prodigious size, particularly struck our attention. These claws . . . are from the most terrible of all the animals of the American continent, the Grizzly Bear, of the Missouri. . . . The London Cabinet of Natural History possesses only a single claw, which is regarded as a great rarity. Gen. Clark has visited, near the sources of the Missouri and Mississippi, Indian tribes which, previous to his visit, had never seen a white man; but among whom he nevertheless discovered traces of an ancient people more civilized than themselves. Thus, for example, he brought away with him a whip which the riders of these tribes do not understand the mode of using on their horses at the present time. The knots of this are very complex, and actually arranged like the knout of the Cossacks. He presented General Lafayette with a garment bearing a striking resemblance to a Russian riding coat. It is made of buffaloe skin, prepared so as to retain all its pliancy. . . . We could have remained a considerable longer time in Governor Clark's museum, listening to the interesting accounts which he was pleased to give us relative to his great journeys, but were informed that the hour for dinner had arrived. . . . [Levasseur, 1829, **2**: 124–126].

The following year Bernhard, Duke of Saxe-Weimar-Eisenach, showed much interest in this collection. His description is so detailed that it is best to quote it in full:

> We then went to see Mrs. Clark, who, through the secretary of her husband, Mr. Alexander, exhibited to us the museum collected by the governor on his travels, and since considerably augmented. Mr. Alexander showed us articles of Indian clothing of different kinds, and various materials—except the leather, the larger part of these materials were American, or rather entirely European in their origin. A single garment alone, was made by the Cherokees of cotton, which was pulled, spun, woven on a loom, made by an Indian, and even dyed blue by them. Besides, several weapons of different tribes, wooden tomahowks, or battle-axes, in one of them was a sharp piece of iron to strike into the skulls of their prisoners; another made of elks-horn, bows of elks-horn and of wood, spears, quivers with arrows, a spear head of an Indian of the Columbia river, hewed out of flint, a water-proof basket of the same people, in which cooking can be performed, several kinds of tobacco pipes, especially the calumet, or great pipe of peace. The heads of this pipe are cut out of a sort of argillaceous earth, or serpentine; in time of war the spot where this earth is dug out, is regarded as neutral, and hostile parties, who meet each other at that place, cannot engage in anything inimical against each other. The pipe which the commissioners of the United States use at treaties with the Indians, has a heavy silver head, and a peculiarly handsome ornamented wooden stem. Farther: Mr. Alexander showed us the medals which the Indian chiefs have received at different periods from the Spanish, English and American governments, and the portraits of the various chiefs who have been at St. Louis, to

conclude treaties with the governor, who is also Indian agent. Among the remarkable things in natural history, we noticed an alligator, eight feet long; a pelican; the horn of a wild goat, shot by the governor in his tour among the rocky mountains, the horns of a mountain-ram, and those of an elk, several bearskins, among others, of the white bear; buffalom elk, of the skunk, which were sowed together in a robe, skins of martins, ferrets, &c. &c., moreover, several petrifactions of wood, and animal subjects, among other, of elephants teeth, a piece of rock-salt, tolerably white, yet not shooting in crystals as the English; various crystals; a large piece of rock crystal; very handsome small agates, which are taken for cornelians, &c. Among the curiosities, the most remarkable were two canoes, the one of animal-hide, the other of tree-bark, a peace-belt, which consists of white girdle, set with glass beads two hands breadth wide; farther, snow shoes, nets which are drawn over an oval frame, also the rackets, which they use in playing their game of ball &c. &c. [Bernhard, 1828, **2**: 101–102].[1]

William Clark's museum was obviously worthy of considerable respect and it remained for at least another decade an object of interest to visitors. Prince Maximilian of Wied in March 1833 also called to the attention "portraits of the most distinguished Indian chiefs of different nations" which decorated the council room. (Maximilian, 1906, **22**: 227). No trace, alas, of these paintings can now be found, but it is almost certain that he had a portrait of Sans Nerf painted by Chester Harding at Saint Louis in 1820, and very probably had work by J. O. Lewis, Peter Rindisbacher, and other artists who were devoting themselves to Indian and frontier subjects.[2]

When Eugène Ney was in St. Louis in June 1833 he found to his surprise that the most interesting visit he made was to the "venerable governor." He had not been much interested when it was first proposed that he go to see the museum, for he had found that in the United States "la passion des museums est générale; chacun veut avoir le sien. Il est vrai de dire qu'on s'y passe cette fantaisie a bon marché: un crocodile empaillé suspendu au plafond, un vieil orgue dans un coin, c'est là généralement ce qui constitute leur cabinet de curiosités, avec la pompeuse inscription de MUSEUM en lettres d'or sur la porte." But General Clark's collection, he discovered, "est très précieuse; elle contient toutes sortes de pelleteries les plus rares, des costumes de sauvages, des armes, des portraits de chefs indiens, des mineraux, des fossiles, etc. Le général en a recueilli lui-même la plus grande partie dans ses voyages; le reste lui a été donné en présent par les diverses tribus indiennes, qui ont toutes pour lui une grande vénération et l'appellent leur père" (Ney, 1833, p. 540).

Less than a year later, Charles Fenno Hoffman, Irving's friend, had the pleasure of dining with Clark (March 13, 1834) and afterward of examining the council-chamber the walls of which he found were "completely coated with Indian arms and dresses, and the mantlepiece loaded with various objects of curiosity connected with the aborigines. Among the latter was that celebrated piece of pottery that has caused so much idle speculation among the curious—a small vase formed by three perfect heads blended in one, the features being marked, and wholly dissimilar from those of any existing race of Indians" (Hoffman, 1835, **2**: 73–74).

Probably other travelers visited this notable western museum during the next few years. The last significant mention of it in print is the statement that appeared in the *Missouri Saturday News* on February 10, 1838 that Meriwether Lewis Clark had just deposited with the Western Academy of Science "the scientific portion of his father's well known and valuable collection." Since there was no mention of any Indian or other museum objects (save one or two war clubs) in the very detailed papers of William Clark's estate, the fate of the collection has remained a mystery. Possibly, as Prince Paul had foreseen, time and vermin had destroyed part, and the portion remaining

[1] Some of these objects may have been among those pictured by George Catlin. See Donaldson, 1885, p. 388 and pl. 96.

The Missouri Historical Society (William Clark MSS.) possesses an undated book entitled *Catalogue of Indian Curiosities in William Clark's Indian Museum*. This merely lists more than 200 specimens. Occasional bits of information as to donor and tribe of origin are noted; there are no dates of accession. It was obviously a large and varied collection which deserved a much better record than we can now piece together.

[2] The catalogue mentioned in footnote 1 did not list any pictures. The inventory of Clark's estate (1838) carries no record of Indian portraits (St. Louis Probate Court, File no. 1416).

went to the Western Academy and to ultimate destruction in the fire that eventually ruined the collections of the Academy of Science of Saint Louis in 1869.[3]

[3] Among the descendants of William Clark there has been an interesting tradition that his collection came into the hands of Albert Koch and that it was by him disposed of for his own profit. I quote from the memoirs of a grandson, William Clark Kennerly: "This museum was a large room filled with all sorts of Indian curiosities, canoes, arms, coats of mail, shields, beds, clothes, ornaments of every kind, cooking utensils, pipes, and knives, dishes, agricultural and musical instruments, head gear, snow shoes, infant's clothing and cradles. It is to be regretted that this collection was not preserved to St. Louis, but about the year 1832 it was borrowed to swell that of a German named Koch, who several years before had arrived in the City with the skeleton of a mastodon and some other curios, opening a museum on Market Street, near Fourth.

"After exhibiting there for a year or more this promoter of his own interest, at least, disappeared between two days with all of the General's collection. It seems strange that no effort was ever made to pursue him and recover them, but owing to the difficulty of travel, and the fact that Sherlock Holmes's ancestors did not hail from this locality, it was considered hopeless and the said curios now repose in some German museum" (Kennerly, 1911, pp. 408–409).

Among the *Clark Papers–E. G. Voorhees Collection*, of the Missouri Historical Society, is a letter from Miss Eleanor Glasgow Voorhees, dated New York City, August 11, 1904, in which Miss Voorhees stated that her great-uncle Edward James Glasgow, of St. Louis, then 84 years of age, "remembered with great distinctness" that Indian collection which she proceeded to describe briefly in the usual terms. She concluded by saying that "during General Clark's life, this collection was kept intact; afterwards . . . for safekeeping, the collection was sent to a public museum, managed by a man named Koch. After a time Koch slipped away from St. Louis, taking the collection with him to England by way of New Orleans. This fact was not discovered in time to recover the articles; but some years later, one of our family thought he identified some of them in London."

Slight faith can be put in the charges against Koch. It is obvious that there are a number of serious errors in the Kennerly account: I have found no proof of Koch being in St. Louis before 1836; Charles Fenno Hoffman was shown the collection by Clark in the spring of 1834; Clark did not die until 1838, and "the scientific portion" of his collection was in his possession until February, 1838; Koch did not have any of his mastodon remains until 1838 at the earliest; his museum was not at Market near Fourth but near Second Street; Koch continued to exhibit until January, 1841, nearly two and one-half years after the death of Clark; Koch did not disappear over night–the newspapers made it common knowledge for months that he intended to leave, his advertisement of sale ran for some months in at least one St. Louis paper; there was a public announcement of his departure for New Orleans; he exhibited for a number of months in New Orleans and the eastern cities before departing for Europe; and there was never any attempt on his part to conceal his movements. According to a news item in the *Missouri Republican*, 30 October, 1841, he had not yet left the east for Europe. It would have been quite easy for either the family or the police of St. Louis to have followed Koch to New Orleans and to have recovered the collection had Koch carried it off illegally. Later they would have had repeated opportunity to force a restitution of some sort. Koch was in Alabama in 1844–45, and from 1856 to 1860 he was an active member of the Academy of Science of St. Louis.

There is, then, *no proof* that possession of the collection ever passed to Koch–only a vague family story that finds expression more than half a century after Clark's death. Whatever did happen to the collection, Koch certainly did not steal it.

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PROCEEDINGS OF THE ACADEMY

469TH MEETING OF BOARD OF MANAGERS

The 469th meeting of the Board of Managers, held in the Tayloe Room of the Cosmos Club, February 16, 1954, was called to order by the President at 8 P.M., with the following in attendance: F. M. DEFANDORF, MARGARET PITTMAN, J. R. SWALLEN, H. S. RAPPLEYE, J. A. STEVENSON, J. C. EWERS, W. W. DIEHL, M. A. MASON, R. J. SEEGER, A. T. MCPHERSON, A. B. GURNEY, W. A. DAYTON, J. K. TAYLOR, A. A. BAKER, LEE M. HUTCHINS, G. F. GRAVATT, C. A. BETTS, L. A. SPINDLER, GLENN SLOCUM, H. G. DORSEY, and, by invitation, HEINZ SPECHT and D. J. DAVIS.

The President announced the appointments of officers and committees for 1954.

The report of the last meeting of the Executive Committee was read by the Secretary, as follows:

A meeting of the Executive Committee was held on Thursday evening, January 28, 1954, at the home of F. M. DEFANDORF. Others present were MARGARET PITTMAN, H. S. RAPPLEYE, J. A. STEVENSON, and JASON R. SWALLEN.

The various activities of the Academy and ways to improve them were discussed. Particular mention was made of the meeting last year at the National Institutes of Health and the desirability of having other similar ones. A series of paid admission lectures was also suggested.

The Treasurer, Mr. RAPPLEYE, presented the budget for 1954. The estimated income is less than the disbursements for the current year, requiring a cut in the budget of some of the offices, particulary the JOURNAL. It was pointed out, however, that the JOURNAL was increased in size last year, and that the funds allotted would probably be sufficient to publish a normal or average volume. The Committee approved the budget of $8,450 for presentation at the next meeting of the Board of Managers.

At his request the Treasurer was authorized to transfer the bank account of the Academy from the Munsey Trust Co. to the Citizens Bank of Takoma Park.

Chairman DAVIS, of the Committee on Meetings, announced that the March meeting of the Academy would be held jointly with the Bacteriological Society, the speaker to be Dr. Henry Welch, of the Food and Drug Administration, on a subject in the general field of antibiotics. The April meeting would be held jointly with the Junior Academy and the May meeting at some scientific institution. It was suggested that in the fall of 1954 the Academy might sponsor a series of three or four lectures directed to the lay public, on factual scientific information of direct interest to the individual. A nominal fee would be charged, and any resulting surplus of funds beyond the cost of lectures would be turned over to the Junior Academy. The lectures might take the place of the regular meetings of the Academy.

Chairman MCPHERSON, of the Committee on the Encouragement of Science Talent, presented changes in the bylaws of the Junior Academy. Action was postponed until the next meeting of the Board to allow time to study the proposals. A motion by Dr. McPherson to authorize a standing Committee on Science Education was carried unanimously. It was suggested that the Committee make early contact with the school board of Montgomery County in regard to school policy in teaching science. Distribution of the reprints of the controversial lecture "The Production of Scientists" was referred to the new Committee.

It was reported that $675 had been received for the Science Fair.

The Secretary reported the death of Frank Wenner on February 6, 1954.

Two Vice Presidents who were not nominated in time for action at the Annual Meeting were unanimously elected: DOUGLAS E. PARSONS, for the District of Columbia Section of the American Society of Civil Engineers, and RICHARD S. DILL, for the Washington Section, American Society of Mechanical Engineers.

The Treasurer presented the following proposed budget for 1954, which had been approved by the Executive Committee:

Receipts	1953	1954 (Estimated)
Dues	$4,651.00	$4,700.00
JOURNAL subscriptions	1,707.75	1,800.00
Interest and dividends	1,794.55	1,800.00
Sales	137.38	150.00
Totals	$8,290.68	$8,450.00
Disbursements:		
JOURNAL and JOURNAL office	$7,200.00[1,3]	$6,700.00
Secretary's office	555.49	550.00
Treasurer's office	187.12	300.00
Meetings Committee	430.51	500.00
Membership Committee	—	15.00
Archivist	—	10.00
Science Fair	200.00[4]	300.00
Science Calendar	75.00[2]	75.00
Totals	$8,648.12	$8,450.00

[1] Partially estimated—all bills not in yet.

[2] Budget amount—actually no payment made in 1953—we paid late in 1952 and will have to pay again early in 1954.

[3] Plus charges to authors.

[4] Budget amount.

After rather lengthy discussion, particularly on the item for the JOURNAL, the budget was approved, with four dissenting votes.

The question was raised as to whether Tuesday is a satisfactory time to hold the meetings of the Board, since the place of meeting has been changed from the Library to the Tayloe Room of the Cosmos Club. In general, Tuesday was found to be more acceptable than Monday, although it was suggested that the third Tuesday of each month would be better than the Tuesday preceding the third Thursday.

Dr. GRAVATT distributed reprints of an article published in American Forests on "Threat to Our Park," concerned primarily with the proposed highway through Rock Creek Park. On motion by Dr. Gravatt, the subject was referred to the Committee on Policy and Planning to determine if any action can be taken.

After adjournment, the Executive Committee held a short meeting. Mr. Rappleye stated that Series G Government bonds held by the Academy amounting to $4,000 were due. He suggested that these funds be reinvested in the Washington Mutual Investors Funds. After due consideration he was given authority to so reinvest these funds, as well as any others derived from selling Government bonds coming due in the current year.

470TH MEETING OF BOARD OF MANAGERS

The 470th meeting of the Board of Managers, held in the Tayloe Room of the Cosmos Club, March 16, 1954, was called to order by the President at 8 P.M., with the following in attendance: F. M. DEFANDORF, MARGARET PITTMAN, J. R. SWALLEN, H. S. RAPPLEYE, HARALD REHDER, J. E. EWERS, W. W. DIEHL, M. A. MASON, R. J. SEEGER, A. T. MCPHERSON, A. B. GURNEY, S. F. FORBUSH, F. W. POOS, G. F. GRAVATT, A. H. SCOTT, L. A. SPINDLER, F. W. HOUGH, E. G. HAMPP, F. N. FRENKIEL, and, by invitation, HEINZ SPECHT, D. J. DAVIS, H. N. EATON, and F. B. SILSBEE.

The President announced the appointment of the members of the standing Committee on Science Education, authorized at the last meeting of the Board:

Raymond J. Seeger (Chairman), National Science Foundation
Clifford A. Betts (Liaison member of Education Committee, D. C. Council of Engineering and Architectural Societies)
Ronald Bamford, University of Maryland
R. Percy Barnes, Howard University
Wallace R. Brode, National Bureau of Standards
Leonard Carmichael, Smithsonian Institution
Hugh L. Dryden, National Advisory Committee for Aeronautics
Regina Flannery, Catholic University
Ralph E. Gibson, Johns Hopkins Applied Physics Laboratory
Martin A. Mason, George Washington University
George D. Rock, Catholic University
William W. Rubey, National Research Council
William H. Sebrell, National Institutes of Health
Waldo L. Schmitt, U. S. National Museum
B. D. Van Evera, George Washington University
William E. Wrather, U. S Geological Survey

Dr. DAVIS, Chairman of the Committee on Meetings, reported that the April meeting of the Academy would be held jointly with the Junior Academy, at which the Certificates of Merit would be presented to selected high school students. One of the meetings in the fall will be held at the Johns Hopkins University Applied Physics Laboratory.

Dr. SILSBEE, Chairman of the Committee on Policy and Planning, presented the following report:

Your Committee on Policy and Planning has given serious attention to the suggestion of Mr. Gravatt that the Academy should take action against the proposed location of a highway through Rock Creek Park. A detailed letter of February 26 from Mr. Gravatt and printed material from American Forests and from The Citizens' Action Committee for Fair Road Planning were at our disposal.

A canvass of the Committee after due consideration showed that most of its members as individuals were strongly opposed to the highway and to the destruction of the recreational value of the Park which would result. Yet, as members of the Committee, they felt that the effect on science in general and on scientific interest and advancement in the Washington area would be so slight as not to warrant the Academy's taking official action in the matter.

There would, of course, be material damage to certain biological features of the Park and the Committee realizes that it would be quite natural for those affiliated societies which feel that their particular interests will be injured to take action against the proposal, if they care to do so.

Your Committee on Policy and Planning recommends that the Board of Managers take the necessary steps to affiliate the D. C. Branch of the American Meteorological Society with the Academy. From our study of its constitution and bylaws, and other information supplied by its secretary, it seems to us to entirely meet the standards set by the Academy.

Dr. McPherson presented the following report:

The Committee on Encouragement of Science Talent nominates the following senior high school students for Certificates of Merit on the basis of their accomplishments demonstrated in the Thirteenth Annual Science Talent Search conducted by the Science Clubs of America and the Westinghouse Educational Foundation.

In recognition of original experimental work:

†MARY JEANNE KREEK, age 16, 4636 Verplanck Place, NW., Washington, D C., Woodrow Wilson High School, Project: A Study of Idiosyncratic Deceptions and Contradictions Encountered in Controlled Allergy.

†ALAN FREDERIC HAUGHT, age 17, 5518 Glenwood Road, Bethesda, Md., Bethesda-Chevy Chase High School, Project:

Spectrographic Determination of Intermediate Products in Catalytic Reactions.

HOWARD MELVIN COHEN, age 17, 10 Thirty-fifth Street, SE., Washington, D. C., Anacostia High School, Project: Embryology of the Chick.

JESSE HOGAN MOTES, age 17, 1610 North Taylor Street, Arlington, Va., Washington-Lee High School, Project: Astrophotographic Photometry.

*ELIZABETH BARRETT NEAL, age 17, 6205 Pontiac Street, Berwyn Heights, Md., Northwestern High School, Project: Relation of Regeneration of Planaria to pH of Water in Which They Live.

*JOHN KENNETH RUSSELL, age 16, 4506 Amherst Land, Bethesda, Md., Bethesda-Chevy Chase High School, Project: Spark Shadowgraph Unit.

In recognition of scholarship in science:

*DON RICHARD BOYLE, age 17, 6407 Elliott Place, Hyattsville, Md., Northwestern High School, Project: Characteristic Curves of Vacuum Tubes on Oscilloscope Screen.

*FRANK MCGLOIN CHILTON, JR., age 17, 2112 North Kentucky Street, Arlington, Va., Washington-Lee High School, Project: Variation of Distance of Shotput with Angle of Projection.

SHALOM FISHER, age 16, 5-D Eastway Road, Hyattsville, Md., Northwestern High School, Project: Electrical Circuits Analogous to Pendulum.

*JO ANN HUMINIK, age 17, 829 Xenia Street, SE., Washington, D. C., Anacostia High School, Project: Amalgam Restorations.

MICHAEL WARREN KONRAD, age 17, 2506 Fort Scott Drive, Arlington, Va., Washington-Lee High School, Project: Proof of Kepler's Law and Construction of a Mechanical Analogy.

*DAVID EPHRAIM LABOVITZ, age 17, Danville Drive, R.F.D. 4, Rockville, Md., Bethesda-Chevy Chase High School, Project: Essentials to be Considered in the Design of the Spectroscopic Densitometer.

*Honorable Mention
†Washington Trip Winners

On a motion by Dr. McPherson, the candidates were approved by the Board. Dr. McPherson was authorized to release publicity about the winners as he saw fit.

Mr. Rappleye reported that he had received a check for $100 from Dr. W. J. Youden for clerical assistance for Keith Johnson in his work for the Junior Academy of Sciences. He stated that $20 more had been received for the Science Fair.

Mr. EWERS, Senior Editor, stated that if the first month was typical the budget allotted him for the JOURNAL would be adequate. Eighteen papers were on hand for publication after the March issue. It is planned to devote a fall issue of the JOURNAL to papers on the scientific contributions of the Lewis and Clark expedition, celebrating the 150th anniversay of the expedition. Papers on geography, botany, zoology, and anthropology would be included.

Changes in the Standing Rules of the Board of Managers, made necessary by the authorization of the Committee on Science Education, were presented by President Defandorf:

Add to: Section 2c (p. 13, 1953 Directory)

ix *Committee on Science Education*

Section 3 line 5 "..... Science Talent," *Committee on Science Education*

After in 13th line "..... each year," insert *The Committee on Science Education shall not be limited as to the number of its operating nucleus to be retained and reappointed from year to year. Its membership shall be appropriately selected to include good representation among the sciences, mathematics, and engineering and with a view to insuring good contact with local school systems.*

New Section *19 The Committee on Science Education shall be concerned with improving the teaching of science within the District of Columbia and nearby Maryland and Virginia within the area (25 mile radius of Washington) of the resident membership of the Academy.*

The changes were approved by the Board.

KEITH JOHNSON, representing the Junior Academy, announced that the Science Fair would be held April 10–13 in the gymnasium of American University. A large number of projects have been entered, some of which will have to be deleted because of lack of space. A general discussion followed on the problems of the teaching of Science, especially that of recognizing science talent.

JASON R. SWALLEN, *Secretary.*

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